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THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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THE BRICKBUILDER is published the 20th of each month.

LAST year we were able to present to the readers of THE BRICKBUILDER a very interesting series of articles describing and illustrating designs for a brick dwelling costing in the neighborhood of ten thousand dollars, the contributions coming from some of our best known architects. With this number we begin another similar series, having to do in this case with a village church to cost fifty thousand dollars. It has ever been our belief that the best way to encourage good architecture is to create it, even if only on paper, and as we a e convinced of the possibilities of brick, we feel we cannot do a better service for our readers or for the profession of architecture than to call out such thoroughly good designs and commendable arrangements as we believe this series will present.

There used to be a saying that it was a poor artist who would complain of his tools. As a corollary of this proposition it might almost be stated that when an artist complains of his material the fault is in the artist rather than in the medium. It has been demonstrated over and over again through the last twenty o: more centuries that noble, impressive works of architecture can be produced with combinations of burnt clay as a basic material, and especially do we find in the past successful churches of this material. It goes without saying that all churches constructed of burnt clay are not successful, and yet the brick and terra-cotta architecture of North Italy, as well as the early Renaissance work from which Mr. Sturgis has drawn, and also certain manifestations of historic art since the fifteenth century, have been so truly in the line of genuine creation that it is not fair to deny the possibilities of brick for the most sacred edifice. A difficulty which we have not yet succeeded in growing beyond is the constant tendency to design our buildings without specific reference to any one material and then to select the medium arbitrarily after the whole design is practically settled upon. Hence it comes that in many of the illustrations of current work it is often difficult to tell whether the design is to be worked out in stone, terra-cotta, or even cast iron. Our hope in presenting this series of typical designs is to aid in the evolution of a proper treatment of what we consider to be one of the most adaptable materials which man has been able to wrest from the hand of nature, and it is our hope that the designs that we shall thus call forth will show the directions in which the study of burnt-clay work can to advantage be carried.

THE past two months have witnessed a most extraordinary advance in the price of structural steel work of every description. Rolled shapes have advanced something over $15 a ton and plates have gone up even more, while as some of the mills adopted the policy of curtailing the output, there has resulted an approximation of famine for some forms, and as a consequence the cost of building has been very materially increased. We recall one building at this moment, which was figured the latter part of last month, on which the advance in steel before any award of the con.ract could be made was sufficient to cause an increase in price of something like $25,000. Development in building construction naturally tends to follow the path of least resistance, and it would not, therefore, be at all surprising if this large increase in the cost of iron should have the effect to very strongly develop those constructions which are independent of metal supports. We have grown so accustomed of late years to steel skeleton construction that we are apt to lose sight of the fact that it is perfectly possible to construct a building, or at least construct many types of building, without using a steel beam or steel column; and now that prices of structural metal are touching the limit of prohibition it may be a good time to see if we cannot improve our brick and terra-cotta construction, perhaps going back to the processes in use when our constructions were more scientifically fire-proof if less knowing than they are now. Surely iron can never be seriously considered a fire-proof material, and a great deal of the terra-cotta and brick which goes into a modern structure is used simply as a protection for what in one sense we would term the weaker material. The path of least resistance and the minimizing of our vertical supports have led us into our present by no means rational constructions. One has only to recall the vast spaces which were enclosed by buildings during the late Roman period to appreciate that our dependence upon iron is not a necessary one.

There is no question about the possibility of improvement in the methods of using brick and terra-cotta for the structural portions of a building. We have not yet reached the ideal application, and it is quite likely that the fact that iron has been so cheap, so handy, and can be used with so little thought has contributed quite materially to our ready acceptance of the forms of brick and terra cotta constructions which, now that steel is becoming so expensive, we might be very glad to modify. We should be glad to see the attempt made to construct a building entirely of burnt clay, omitting steel columns and beams entirely. We are apt to think of an all masonry structure as being necessarily heavy and unsuited to modern needs, and yet there never was in the whole past history of the world a

lighter, more open construction than that which prevailed during the height of the Gothic development, when the supporting members were reduced to an extreme minimum, and large spaces were vaulted with a daring and skill which we should be glad to see imitated in our day. If the rise in steel has a result of developing the possibilities which lie dormant within our reach, it will have been worth while for our constructors to have paid the high prices which are now prevailing, for while undoubtedly the prices will go back to somewhere near the quotations of a year ago, the right kind of thought expended upon brick and terra-cotta construction will be sure to bring out possibilities which will enable our buildings to be lighter, better built, and more thoroughly fire proof.

THE Department of Architecture of Harvard University, though among the youngest of the schools of architecture in this country, promises to take a high rank in its relative endowments. This department was begun only about five years ago. There had been an assistant professorship of architecture in Harvard College for many years, and the lectures which were delivered by Prof. Charles Eliot Norton and Prof. C. H. Moore were of the highest character, but the purely architectural work, by which we mean the work intended to fit students to become architects rather then mere dilettanti, is of more recent date. For the first three or four years the Department was supported almost entirely by private contributors, of whom the best known to the profession was the late Mr. Arthur Rotch, he giving very freely both of money and time to the needs of the Department, and with Mr. Robert S. Peabody taking a very active share in the counsels which have given this school its peculiar character. This year the Department has received two very decided marks of success. The first was the endowment of a traveling scholarship, to be awarded under the direction of the professor of architecture, the annual money value of the prize being one thousand dollars. Following this comes the more recent announcement that some one, who does not wish his name to appear, has given two hundred thousand dollars to the University for the use of the architectural department, one half of which is to be used for the construction of a building. This structure is to be located between Quincy Street and the Fogg Art Museum, and it affords an opportunity which it is hoped Harvard will not neglect of adding to the only too few really good examples of architecture which are possessed by the University.

STUDENT work is always interesting. The enthusiasm which forms so important an element of all college work and which crops out so artlessly in some of the designs which our ambitious, aspiring, prospective architects labor over so seriously, all has a charm for even the most hackneyed practitioner. It is interesting to see how the young men do it now, and to wonder how we might have done it ourselves. And when the work is, on the whole, of as really high grade of excellence as is shown by the Year Book of the School of Architecture of the University of Pennsylvania, we can quite sympathize with the Philadelphians in their pride of this institution. The Year Book is a volume of eighty pages, strongly suggestive of the annual exhibition catalogue, even to the extent of the advertisements, but showing in its fifty or more illustrations that the University is doing serious work and that it comes under the kind of direction which ought to be of the highest value to the students who profit thereby.

MISCELLANEOUS.

THE Hearst bill recently passed by the Illinois Legislature, creating an art commission for the city of Chicago, provides that, "hereafter no work of art shall become the property of the city by purchase, gift or otherwise unless such work of art, or a design of the same, together with a statement of the proposed location of such work of art, shall first have been submitted to and approved, by the commission, nor shall such work of art, until so approved, be erected or placed in or upon, or allowed to extend over or upon any street, avenue, square, common, municipal building, or other place belonging to such city, or any park, boulevard, or public ground situated within the limits of such city. The commission may, when it deems proper, also require a complete model of the proposed work of art to be submitted. The term 'work of art,' as used in this connection, shall apply to and include paintings, mural decorations, stained glass, basreliefs, or other sculptures, ornaments, fountains, images, or other structures of a permanent character intended for ornament or commemoration. The term 'municipal building,' as used in this connection, shall include all public schools, and all buildings or portions thereof, and all grounds used for school purposes in such city."

The commission is to consist of the mayor, the president of the Art Institute, the presidents of the Park Boards, and three members to be named by the mayor. One of the three appointees must be an architect, one a sculptor, and one a painter. The mayor has selected respectively for these three appointments, W. L. B. Jenney, Lorado Taft, and Ralph Clarkson.

THE following suggestions were contained in the recently rendered report of the Tenement House Committee of the Charity Organizations of New York City, of which Messrs. George B. Post and Ernest Flagg are members: that there be a minimum size for living rooms; that there shall be light shafts at least 6 ft. wide; that there shall be one bath room for at least every twenty families; that the height of tenement houses shall not exceed six stories, and that playgrounds shall be provided on the roof, being made safe by carrying up the exterior walls 3½ ft.

In their communication referring to the present law the committee says:—

"It is the opinion of those whose daily occupation brings them into direct personal contact with the people living in tenement houses, and whose work takes them into these buildings every day, that the buildings erected under the present laws are in many respects much worse than the old buildings erected thirty years ago." The problem which the committee seeks to solve is how to build on the ordinary city lot so as to secure fair income to the investment, and provide healthful conditions for tenants.

STATISTICS for the six months ending June 30 indicate that the building operations of 1899 will be considerably in excess of the operations of 1898, although the rate of increase may not be as high during the latter half of the year as it was during the first six months. The official statistics from the building departments of twenty leading cities show that the operations were over one third greater during the first half of 1899 than for the same period of 1898. The total expenditure for buildings in these cities during the first six months of this year were $135,649,484 as against $98,660,254 for 1898, an increase of nearly $37,000,000, or 37.4 per cent. The comparative figures for the first six months of 1899 and 1898 are given in the following table:—

	1899		1898		Per Cent.	
	No.	Cost.	No.	Cost.	Gain.	Loss.
New York (Boroughs of Manhattan and Bronx)	4,565	$71,370,870	2,787	$42,962,519	66	....
Borough of Brooklyn	3,724	12,830,985	3,006	7,891,290	63	....
Chicago	2,118	11,865,260	2,082	10,152,800	17	....
Philadelphia	4,026	10,420,430	3,997	12,167,470	....	14
St. Louis	1,150	4,195,295	1,387	4,373,122	....	4
Washington	1,385	3,505,363	1,086	3,425,311	45	....
Cleveland	1,490	2,918,370	1,491	1,665,777	75	....
Pittsburgh	1,054	2,908,720	747	2,683,736	8	....
Detroit	1,183	2,090,700	1,076	1,938,100	8	....
Milwaukee	736	1,961,298	615	1,469,971	33	....
Kansas City	1,806	1,904,780	1,458	1,364,100	51	....
Buffalo	813	1,616,497	980	2,344,299	....	31
Minneapolis	1,720	1,512,131	1,433	1,231,273	23	....
Los Angeles	875	1,119,537	735	1,034,651	8	....
Cincinnati	1,140	1,112,124	964	1,220,315	....	9
New Orleans	864	987,210	734	680,760	45	....
St Paul	542	797,538	495	509,341	57	....
Louisville	2,263	791,527	1,033	821,508	....	4
Toledo	....	765,530	....	465,655	64	....
Allegheny	562	571,125	319	572,625	....	....
Omaha	410	404,394	530	784,623	....	48
Totals for twenty cities		$135,649,484		$98,660,254	Inc. 37.4 p. c.	

— *Construction News.*

·MONTEVENTOSO·

by BERTRAM·G·GOODHUE

IT is but a poor place, this Monteventoso, and scarce worth discovering, after all's said and done. Were it not that Italy has been so ransacked within the past seventy-five years without even a stray mention of the town finding its way into Murray or Baedeker, I should scarcely dare to notice it here. The railway from Bologna to Pistoja passes within a few miles of it, and but for a promontory of crag and cliff it would be plainly visible to the bicyclist pedaling the highway between Pievepelago and Cutigliano.

It is quite possible, though, that I am quite in the wrong, and my discovery will turn out to be well known to the *cognoscenti* in Italian travel merely as a place of very meager interest in a region so rich in historical tradition and monuments of art as is Emilia, furthermore one to be avoided as cold and uncomfortable in the matter of the hospitality dispensed at its inns, while its edifices are despised of architects as not only vastly excelled in every particular, but almost exactly paralleled by other far more famous and accessible cities. No — despite the announcement that in Monteventoso were to be found "notable" buildings, the author must beg leave to deny any responsibility for the statement.

It would be difficult, indeed, to point out in what particular the buildings of Monteventoso possess this quality of notability. To be sure, antiquity is theirs, and to most Americans antiquity makes largely for "notability," while about the old shadowy streets and glittering roofs and towers is crystallized enough legendry to equip a dozen of our States. Centuries of bloody history and clusters of hoary tradition are very pretty things in their way, but architecture is almost an exact science, a thing of scale and plumb-line; hence it is not to be wondered at if Monteventoso has received but scant consideration from those who have given us the whole history of architecture in a neat octavo volume.

Still, it is curious that the town has escaped the archeologist, for it is certainly rich in late Roman remains. Everywhere are to be espied fragments of this period. They seem to have been especially popular as quoins during the Middle Ages, while the columns and frieze of the chapel porch of the church of Santa Caterina once, so they say, formed part of the ancient temple of Boreas; and, too, the road and causeway leading down from the town, over the little river which skirts the base of the eminence, and thence out across the level plain towards Modena, bear less interesting but no less distinct traces of the heavy hand of the one-time mistress of the world. Yes, the archeologist, he who has picked, dug, or hammered his way over the land with such remarkable results, might here make a number of quite stupid discoveries, I feel sure. For instance, the author is no archeologist, but there is an archway constructed by Gian Galeazzo Visconti in 1398, almost entirely of classic fragments, at the foot of the hill at the intersection of the Roman way and the more modern Strada Maestra, and despite my very halting Latin I am quite certain that on one of its stones — the center one in the right-hand pedestal as you enter the town — is an inscription to the effect that here Marcus Brutus erected a column commemorating the loyal devotion of the inhabitants to his cause in the year 78. Then there is the strange, artificial, and doubtless funereally intended cavern above the town, now called the Grotto of Egeria, in which a more practised eye than mine might see signs of genuine Etruscan handiwork.

But, after all, these are but surmises, and even if correct, quite foreign to the purpose of this paper. Enough classic work remains to prove that Monteventoso was as unknown in the days of Alaric and Attila as it is now, and it would be pathetic indeed if, after all the centuries of repose from invasion it has enjoyed, it should at this late day fall a victim to some devastating modern Goth, one who would pick the old fragments from their long-accustomed homes, filling their places with brand-new brick and stucco, simply and solely that his name might appear "writ small" in some museum catalogue.

As elsewhere, all the life and most of the interest of the town center about the *piazza*, in spite of the fact that the principal structure, the church of St. Catherine, is perched on the hillside some little distance above. Charlemagne is currently reported to have assisted at the pious work of beginning this church, even to the extent of relaxing his regal attitude and stiffening his regal muscles sufficiently to lay the corner-stone with his own regal hands. If you demand proof of this occurrence, it is before your eyes in one of the clearstory windows; to be sure, this glass cannot be earlier than the close of the fourteenth century, but tut! in matters of this kind one shouldn't be too particular, and what suffices for the excellent old *prete* and simple townsfolk ought to be enough to quell our doubts as well.

The church of Santa Caterina (da Alessandria) served at one period of the past as a cathedral, and even to-day is often so termed by the inhabitants, though its last bishop was deposed nearly two centuries ago, and now its services are far from magnificent, conducted as they are by one poor priest with two attendant acolytes, one of whom is a lame lad and the other, when not robed in shabby red and dubious white lace, spends his time officiating as a sort of half sacristan, half gardener. With the dawn of modernism, with "United Italy," with shearing from the Holy Father all his temporal dignities, has come a forgetfulness on the part of the people of the dark, dusty old church high above them, and the contrast of an evening of the two quarters, the secular and the religious, is marked indeed. You have but to leave the *tavola rotonda* of your hotel —

the Albergo della Ruota is the better of the two barely tolerable ones — and step out into the Piazza Re Umberto, to find yourself in the midst of a very fair, though, of course, highly provincial imitation of Milan, and even of Rome. Up and down parade a throng of citizens: portly shopkeepers with their beetle-browed wives, stray soldiers having somewhat the appearance of banditti turned Knights of Pythias, sad-looking, nondescript individuals seated about the café tables; the *élite* of the town for the most part, with long names, but with purses barely long enough to purchase them the little glasses of vermouth or *aperatif* they so delight in; a band, perhaps, if it chance to be the evening of a *festa*, the strains of whose music are nearly obliterated by the screaming of innumerable children and barking of still more numerous dogs. But walk to one corner, mount the little *Contrada degli Avvellenatori* all twists, turns, and steps. In a few moments these will bring you to a region very different from the one you lately left. The blue-black shadows are but semi-occasionally troubled by lamp brackets, and it is only rarely that you meet people, strange, skulking, and noiseless, who creep eerily from black blot to black blot, creatures of the night you think, but who turn out to be only a half dozen or so poor old women on their way to deposit at the church the few *centesimi* they have managed to save during the week. God, who alone knows how, will assuredly reward them. At last, after a particularly toilsome flight of tortuous, time-worn steps, you come out into the little "Giardino Pubblico," an absurd appellation, since it contains only a few scrawny and stunted trees and wind-swept plants. Across this "garden" rises the dim façade of the church of St. Catherine, its rose window, in the form of an immense wheel in allusion to the legend of the saint's martyrdom, glimmering faintly from the few flambeaux within, and from its open doors coming the sound of a droning Gregorian, cut short every now and again by sharp gusts of the eternal winds from which the town derives its name. The unknown architect of the church evidently considered this blast a not-to-be-despised enemy when he constructed his thin but massive companile and abutments, both of which appear the more enormous when contrasted with the delicate detail of the church itself.

On the façade are many figures, in marble and pale gray terra-cotta, of different degrees of merit, from the veritable marvels of grace and action by Begarelli and Zarabaja, back to the crude and amusing but interesting early Lombard attempts to portray the "human form divine." The townsfolk, aided and abetted it is to be feared by the priest, with little reverence for mere antiquity, have not scrupled to remove the earlier and poorer of these figures to the *museo lapidario* in the library below, filling their places with smart, new, attitudinizing ladies and gentlemen in glaring white marble from the sculptors' shops of Carrara, Modena, or Pistoja. *Sic transit*, etc., though doubtless the venerable gray worthies of old time, Gervasius and Protasius, Nazarius and Celsus, even good Ambrosius of Milan himself, now find themselves far more comfortably situated among their Etruscan and Roman countrymen in the museum than they ever were huddled back in their niches of Santa Caterina to escape the bleak mountain winds.

Though there is considerable of note in and about the church, little of it is sketchable. The crypt or *'scurolo*, as it is called, seems sufficiently ancient to give color to the Charlemagne legend, and its fading and ruinous frescoes are well worth examining closely with the aid of the torch supplied you by the sacristan for a *soldo*. This crypt is but a few steps below the level of the nave, the chancel being raised as at Modena, from which it is probably copied.

In the treasury — the third floor back room of the sacristan's house — are a number of relics of Gothic and Lombard times, a manuscript *sacramentum* given to the then bishop of Monteventoso, by Queen Theodolinda, a beautifully wrought *pale* or altar front of gold, silver, uncut gems, and enamel, worthy to rank with the best extant work of the kind but by an utterly unknown artist, an *ostensorium* accredited to Cellini,— scarcely important enough to have come from his hand, it is more probably the work of some one of his imitators,— beside many less noteworthy objects, badly shattered diptychs, Renaissance candelabra, and the like.

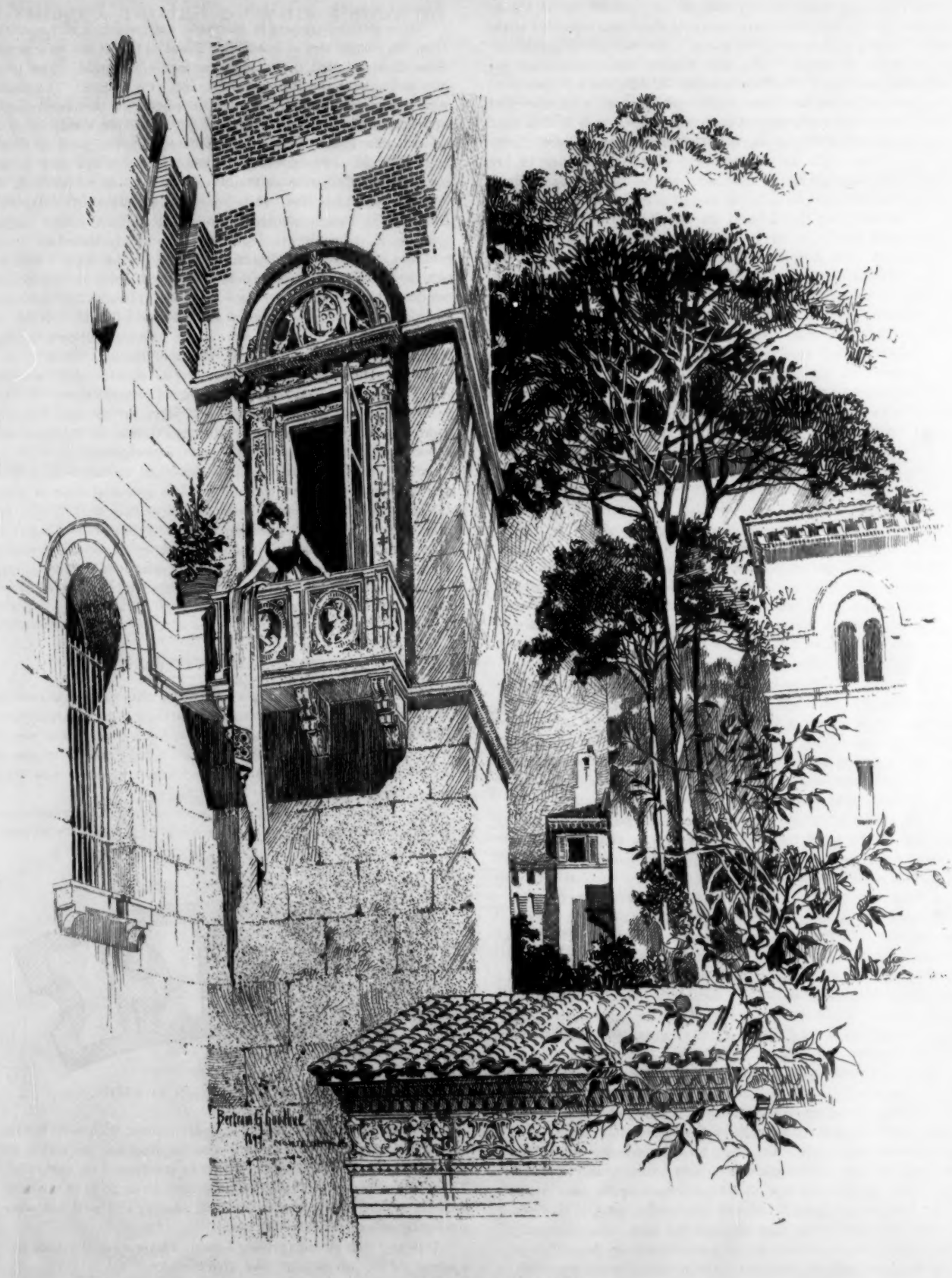
The old priest is deeply interested in the welfare of his flock, on the material rather than the spiritual side it seemed to me, and frankly and most volubly regrets that he is not permitted, for a consideration, to part with such articles appertaining to his church as possess an intrinsic and not miraculous value. The money obtainable in this way might be put to good use in the most practical of fashions; for instance, the sacristy and chapels needed retiling badly. Had not Matteo Ghitti, the roofer, so informed him? And beside, if the frescoes of the choir (by Lionello Spada and dated 1597) could only be touched up in cheerful colors by his friend, Luigi Moncalvo, the artist in the Borgo della Montagna, how much more honor would redound to the church, and, a natural sequence in the priestly brain, how the wealthy *forestieri* would flock to poor old Monteventoso! Alas! Even clericalism has been tinged by the prevailing spirit.

No, after all, if one is to become acquainted with the place it is best not to waste time poring about the dingy old church, but rather by returning to the *piazza*, its musical and unmusical sounds, its clamoring people, its miserable bronze Umberto, and rickety iron café tables. Even here, if one happens to be architect, artist, sculptor, or poet, and few sojourners in Italy escape a touch of one or all of these things after a little (I have known a Kansas City wheat-broker to turn connoisseur on a three weeks' stay and begin a mad career after extremely dubious old masters on his return to his native heath), he will grow weary of the throng and let his eye rove above the heads of the people to where the tops of the old buildings meet the sky. Among these are the library and museum of Gian Galeazzo Visconti, a large edifice in the Lombard style, in brick and terra-cotta, with the arched heads of its openings pointed for the most part, but with a curious admixture of Florentine influence, especially in the heavy, rather forbidding ground-story walls and in the cornice, which, although of terra-cotta, and consequently much lighter in effect, recalls that of the Palazzo Riccardi, so familiar to us all and so frequently in evidence now-a-days,— a mere streak at the top of some sky-scraping office building in the United States of North America. The open upper story of this building, formerly frequented by the young lords with their *bravi* as affording excellent space for fencing and tennis, has been with a commendable spirit of economy ("United Italy" again) leased to a well-to-do peasant for the raising of silk-worms and storage of acorns and chestnuts. Near the library, but on another side of the *piazza*, towers the old palace of the Signori Scogli, now converted into offices for the administration of the local government, its machicolated battlements seeming to frown down their present degradation and the *torricella* of Count Ercole, to climb up, away, anywhere to escape its fate and to forget that in its lower stories, once the haunt of valiant men-at-arms and graceful pages, a few crabbed notaries are snoring away their office hours.

Listen to the faithful chronicler's account of but one episode in the dark past of the palace which occurred about the end of the fourteenth century. I translate freely: "My gentle lord, the young, beautiful, and brave Count Ascanio, in the course of a secret mission to Perugia, had occasion to sup at the house of the Signori Baglioni. Before the company were seated it fell about that my lord's eyes met those of Narcisa, the fair daughter of his host. Now with the gentle family of the Scogli to think is to act, and finding himself on the instant madly enamoured, he begged her to pace with him the walks of her father's garden, meanwhile dispatching his page to see to it that faithful and valiant servitors should station themselves in all quietness near the enclosure wall. Now it chanced that the Baglioni were intending to mingle *acqua tofana* with the wine served their guest, and they liked not well to see the lady Narcisa pass into the darkness of the gardens with my young lord. In and about the moonlit glades and deep shadows they wandered, until they had neared the wall at the farther side. Here my lord, quickly covering the lady's mouth with his mantle that her cries might not be heard, mounted the walls with her and departed. Before the stupid Perugians could recover from their astonishment sufficiently to mount and after,

THE CAMPANILE OF SANTA CATERINA, FROM THE PIAZZA.

THE PIAZZA UMBERTO AND TOWER OF COUNT ERCOLE.



NARCISA'S BALCONY.

my lord was safe from their pursuit, and though they were insolent enough to come under the very walls of our beloved city of Monteventoso, yet my lord's retainers soon sent those that remained at the end of the day back to their foul home. But woe to the gentle and heroic house of Scogli! The lady Narcisa had accompanied my lord most unwillingly; finding resistance in vain, she had seemed to acquiesce, but on my lord's arrival, she had requested a confessor and from him had obtained a weapon, none knows how, but in all likelihood by some sweet sorcery, for she had associated from her youth with witches. That night, as my lord held converse with her in her chamber, she stabbed him to the heart, and tearing his blood-stained doublet into little strips, made for herself a rope with which she let herself descend into the arms of the rascally priest, whom she had so enchanted that he, at her command, had stationed himself below her balcony. Yet not long did the evil deed go unrewarded, for within the hour my lord's death was discovered, the lady caught in the priest's arms, and the two righteously slain before the door of the cathedral."[1] The window and balcony in the *torricella* from which the lady descended after her deed of violence are still pointed out and, besides their association with the tale, are of some architectural interest. In the panels of the balcony are glazed terra-cotta relief medallions of three of "gentle" young Ascanio's forbears, while within the very room in which he breathed his last broken and blood-choked breath hangs a beautiful profile portrait by Piero della Francesca, supposed to be that of Ascanio's unwilling but scarcely virtuous lady love.

However Monteventoso may have escaped devastation at the hands of enemies, Visigothic or Umbrian, it certainly bore its little part honorably or dishonorably during the strifes of the two great factions, and the presence everywhere of the forked battlement testifies to its loyal and constant sympathy with the Ghibellines. The ferocious Ezzelino Romano, the "scourge of God," for some time held the town, and a small, narrow-fronted house in the *Contrada degli Avvellenatori* is still pointed out as his abode, though for no better reason, apparently, than that its walls are surmounted by the above form of battlement. Through thick and thin the little town, perched upon its craggy hillside, maintained unswervingly its devotion to the party whose principles had been espoused by the Scogli, and all efforts to take or destroy it were abortive. This does not necessarily indicate any unusual degree of prowess on the part of its indwellers, but testifies rather to the shrewd foresight of its shadowy original founders, Etruscans, Boians, or what and whoever they may have been, that 'stablished it upon a well-nigh impregnable spur of rock.

Their loyalty at last brought the inhabitants substantial returns, for at the beginning of the fifteenth century the all-powerful Lord of Milan, Gian Galeazzo Visconti, was pleased to admire their town and to load it with favors. To him is due the triumphal arch or city gate, and likewise the library, the plans of which were probably drawn by Marco de Campione, though certain details seem later in date and resemble the work of Duccio, the Florentine. The three-bayed portal and vestibule, with its delicate early Renaissance detail in creamy marble surrounding reliefs in glazed and tinted terra-cotta, is certainly not the work of the Lombard, and while this portico can scarcely be said to adhere very rationally to the original structure, still the conjoining of the different styles appears less awkward than one might suppose.

The large windows of the principal story are good examples of veritable Lombard Gothic, and apart from their plastic character form charming harmonies of color among themselves and afford a most pleasant contrast to the gray walls of the Signoria. It would have been an almost impossible undertaking to make measured drawings of even one of these, but there are some very similar ones in Gruner, lacking, however, that which all drawings of such work must needs lack, the infinite variety of detail and shimmering play of tint and surface of the work itself. Not only are the ornaments constantly varied, foliated or geometrical scarcely ever repeating themselves in exactly the same form, but even the plain surfaced bricks are subtly formed of various sizes to suit different localities in a way not to be dreamed of to-day.

It is certain that here in Northern Italy, within a very restricted area, the architecture of baked clay found its fullest and most artistic expression, and that, too, during the medieval period. The purist may rail against the Italian Gothic, and with justice. The gloomy style of the "*Tedeschi*" was quite impossible of comprehension or appreciation by the Southern mind, yet before the wonderfully conceived and still more wonderfully executed detail of such structures as the Certosa di Pavia, Crema Cathedral, or even this poor forlorn church of St. Catherine at Monteventoso, he must confess that the lesser known and even quite forgotten sculptors of Lombardy, Umbria, and Tuscany succeeded in giving to their plastic fancies qualities of debonair grace and delicacy utterly unknown to the colder, more self-restrained craftsmen north of the Alps. And not only the intricate and profuse detail, but almost every portion of their buildings, was fashioned by these forgotten Italians from the same material; as a delightful author and traveler has said, "What the marble quarries of Pentelicus were to the Athenian builders, the clay beneath their feet was to these Lombard craftsmen. From it they fashioned structures as enduring, towers as majestic, and cathedral aisles as solemn as were ever wrought from chiseled stone."[2] This is the expression of no unprejudiced judge, to be sure, but of a sworn lover of the South and of all things classic, yet from one very logical point of view it is, without doubt, entirely true.

Every possible variety of tone and tint seems to have been known from deep purple through a warm gamut of color to palest dove-gray, and these contrast harmoniously or fade suavely into the marvelous coloring of their background of landscape, — the distant violet hills, the almost spiritually delicate green of the budding lemon trees, the hoary olives, the Lincoln green of the tall, columnar cypresses, or the sad tints of russet and dun of the mountain side.

(*To be continued.*)

[1] *Storia della Famosa e Valiante Casa di Scogli*, by Fra Pietro Adulatoro. Milan, 1673.

[2] *Sketches in Italy*, J. Addington Symonds. Leipsic, 1883.

ROMAN BRICKS AT BATH.

THE following illustration shows some bricks found a year or two ago during excavations amongst ruins at Bath, which have been unearthed by our contemporary, *The Engineer*. One or two of these bricks are still perfect, and there are a large number of pieces preserved locally, as also blocks of brickwork, showing how they were employed.

The roofs of the dressing rooms were covered in some instances with flat arches of brick, and as these would have fallen in by their

ROMAN BRICKS EXCAVATED AT BATH.

own weight if constructed in the ordinary manner with solid bricks, hollow voussoirs were molded with a semi-cylindrical projection on one side and a semi-cylindrical cavity to correspond on the other. The bricks were made slightly wedge shaped, so as to fit in the most accurate manner, and were finished off sharply and well, but were apparently of ordinary clay fire burnt.

It is said that an enterprising London clay-worker will take out a patent for the bricks. — *British Brickbuilder.*

A Village Church, Cost Fifty Thousand Dollars.

PROGRAM.

A CHURCH is to be built for an Episcopalian society in a Northern town of twenty-five thousand inhabitants. The site proposed is a corner lot 160 ft. deep and 140 ft. front, with a western exposure on the narrower front, which faces a small public park. The streets meet at right angles, are wide, and are shaded by large trees. The lot is level on the 140 ft. front, falling 5 ft. towards the rear. Directly opposite the church across the square will be built the public library.

The church is to have a seating capacity of about four hundred and fifty, with space for organ and for choir of twenty-five in a chancel, and it should be preceded by an ample vestibule. Adjoining the chancel will be a study and a room for the choir, each of about 200 sq. ft.

There will be on one side of the church a parish house, to include a Sunday-school room to seat one hundred and twenty-five, a kindergarten for twenty-five, three class rooms for twenty-five persons each, and a room for library of about 160 sq. ft. The Sunday school room is to be so disposed that it may be used for receptions and social gatherings, and in connection with it there is to be a small kitchen with pantry. There are also to be provided two sets of lavatories.

The style of the design is left optional, except that it is to be such as would be adapted for execution in brick with trimmings of molded brick and terra-cotta.

A sketch plan giving the general dimensions and a perspective of the exterior are required, together with such other sketches and details of individual portions of the design as seem desirable to elucidate some point in the scheme not otherwise expressed.

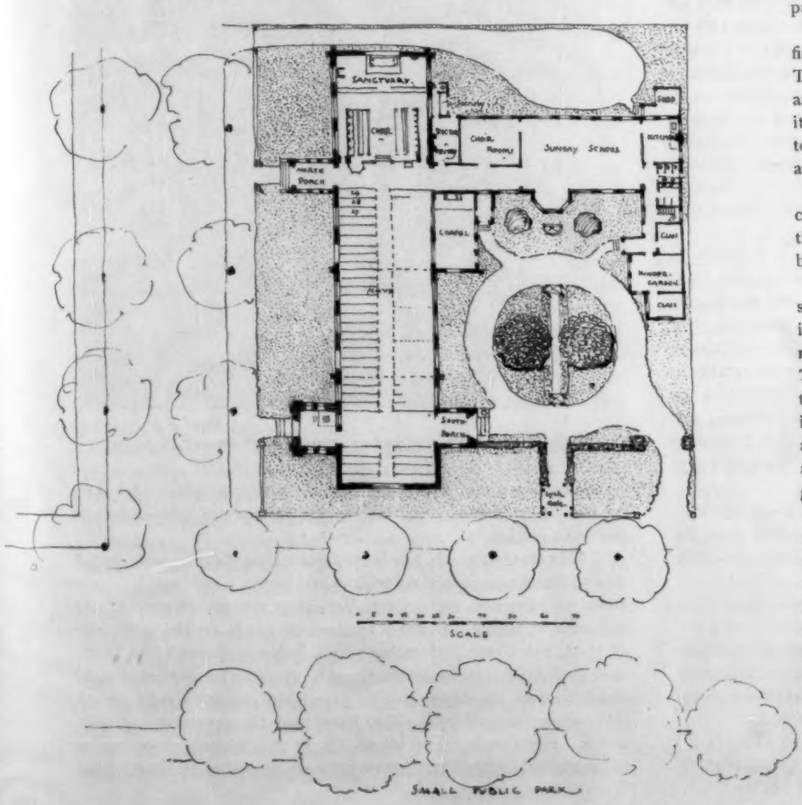
CONTRIBUTION.

BY R. CLIPSTON STURGIS.

To a certain extent a church is a public building: all approaches, entrances, and exits should therefore be obvious and easy.

The needs of the modern parish are no longer met by a building to contain a weekly congregation. The parish is a complex or-

ganization with many branches of work, requiring special buildings and rooms. These requirements, as outlined in the programme, embodying rooms for church and parish work, necessitate a group of buildings which must be independent and yet contiguous and compact.



The lot is a comparatively large one and the first consideration is the position of the church. The corner is the natural site, being most important and also most accessible. Other things being equal, it is desirable, on account of custom and association, to orientate the church. This is obviously the best arrangement here.

Of the various accessory rooms, the vestries for clergy and choir are the ones which must be nearest the chancel, and the clergy vestry and sacristy are better if absolutely adjoining.

Next to these in importance comes the Sunday school. As this is for a large number of children, it should be lofty and well lighted, while the class rooms for smaller numbers may well be lower stud. The Sunday school is therefore placed next the vestries, because of the importance of the position, which is easy of access to the church, and also conveniently approached from the outside. This enables one to accent its central position as the building from which grows the daily life of the parish.

Over the class rooms is the library, with the staircase and lavatories dividing them from the Sunday school, and thus putting the children within easy reach of lavatory and stairs to library. The kitchen is behind the Sunday school, convenient for service, out of the way, and approached for supplies, etc., from the rear. Finally the morning chapel for daily service is placed where it is as convenient as the chancel to the vestry, easy of access, capable of being heated independently of the church, and yet so arranged as to be available for extra seating in the church when needed.

The whole group now forms three sides of a

quadrangle. The church is orientated, the Sunday school with light east and west is sunny both morning and afternoon, and the whole quadrangle is sunny and retired and yet obviously public and open to the street like a miniature park. This will help to harmonize it with the park opposite, and each will help the other.

The suggestion for laying out the grounds will probably explain itself. The road, which comes in at one corner so as not to break the front, reaches church, chapel, Sunday school, and stairs to library. The axis of the lot is placed arbitrarily on the Sunday-school bay, and this is further emphasized by a lych-gate on the street, hedged path to the road, a straight path bordered with narrow flower beds, across the green, arbors for climbing roses at each end of the path, and, in front of the Sunday-school bay, a drinking fountain. Large trees help to shade the green.

As to the interior, the plan is sufficiently in detail to show the general scheme, of which the chief aim has been to give the best accommodation and the most interesting masses and groups without much dependence on elaboration of detail or richness of material. The church is uniform in section throughout, but the chancel is emphasized by a chancel arch, and is narrowed by taking the communicants' passage up behind the stalls on either side. The roof is rather low pitched and is of simple open timber framing with queen-post trusses, taking the 30 ft. span. It is divided primarily into bays of 35 ft. each, and these in turn subdivided into three of 11 ft. 8 ins. Each smaller bay accommodates four pews. The vestries are one story and are ceiled. The Sunday school is 17 ft. high to the trusses, which are similar to those in the church. The kitchen has a second story, which contains room for janitor. The kindergarten wing is two stories and contains on the second floor the library, which is 13 by 30 ft., and a square bay. It is ceiled with a barrel vault of plaster following the lines of the semicircular roof.

As to the exterior, Gothic has been avoided because stone is not to be used, and in stone lies the keynote of Gothic work. A molded material is not suitable for a style where repetition is a distinct blemish. On the other hand, however, Gothic forms and masses are so associated with the whole history of the Anglican church, of which the American church is a part, that one regrets taking an absolutely classic model. Under these circumstances, we turn to the period when in England detail was classic in form, and yet the planning and masses were in the spirit of the earlier times. This gives us the long, narrow proportion of the nave, the Sunday-school room with its lofty and deep bay, and the general arrangement of the plan, hinting at symmetry, and yet not having the obvious balance of a good classic plan.

Furthermore, this style, if one may call it such, demands no elaborate detail, no traceried windows, nor much carving, but looks best with simple large openings fitted with well divided sashes, and finds its chief effect in quiet wall surfaces devoid of ornament. One can use white terra-cotta for the coping, string courses, architraves, heads and sills of windows, and for the remainder a good red brick. Thus with simple material one depends for the effect outside on the proportion of the various parts, and the relation of the masses; and for the effect inside on large rooms, well lighted and treated in simple colors, — chiefly black or brown wood, and gray or green walls.

Following these lines, the whole establishment could be built and equipped, and the grounds laid out and planted, and even the exorbitant fees of the architect paid for the amount prescribed, fifty thousand dollars ($50,000).

NOTE. — Certain departures from the programme have been made. The choir room would be too small for practise if only 200 sq. ft. It is planned 15 by 20 ft. The rector's room has been decreased to 10 by 15 ft. The kindergarten is slightly increased beyond the requirement of twenty-five little children, and two class rooms reduced slightly, while the third is combined with the library. This gives four rooms of different sizes: one 8 by 10 ft., one 10 by 13 ft., one 12 by 18 ft., one 13 by 32 ft. This latter, library and class room together, is nearly three times as large as the required library.

Church Architecture in Materials of Clay.

BY THOMAS CUSACK.

THE unexpected appearance of a shapely tower looming up against a distant horizon, about the beginning of the present year, led to the discovery of a church, rectory, and parish buildings then nearing completion. Rising abruptly out of an expanse of tin-roofed tenements, this tower furnished a standing invitation to those who had viewed it from a distance, if only as a new point of attraction in an otherwise uninteresting sky line. A nearer approach, in this case, lent some enchantment to the view; for though still surrounded by scaffolding, the skeleton of its high pitch roof became visible, flanked at the angles by four octagonal turrets and embellished on the sides by four unmistakably Gothic gablets; below this, a deep belt of surface tracery on an ashlar background; the whole resting on a string course, accentuated at intervals by gargoyles of the requisite vigor and ferocity. Closer still, and this tower proved but the finger-post that had guided our footsteps to an exceedingly interesting pile of brick and terra-cotta; for, with the exception of the steps to the several entrances, no stone has been used, inside or out. These buildings have since been illustrated in line from the

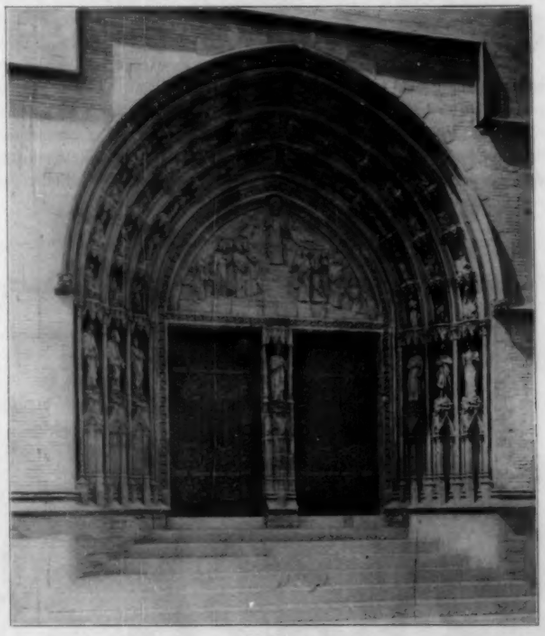


FIG. 16. PRINCIPAL ENTRANCE, CHURCH OF THE HOLY TRINITY.

architects' drawings, with a degree of liberality to which they were entitled, in a journal [1] "devoted to the interests of architecture in materials of clay."

This church, which has been named Holy Trinity, with its adjoining buildings, is in the parish of St. James, New York City, and owes its existence, we believe, largely to the munificence of the Rhinelander family. It has a frontage of 275 ft. on the south side of East 88th Street, and extends back half-way through the block. Architecturally, this important group is the work of Messrs. Barney and Chapman, and cannot fail to have added much to their reputation as church builders. They have used terra-cotta successfully, and on several previous occasions, but in this instance they appear to have gone further than the majority of American architects have

[1] THE BRICKBUILDER, May, 1899.

FIG. 14. CHURCH OF THE HOLY TRINITY, EAST 88TH STREET, NEW YORK.
Barney & Chapman, Architects.

yet dared to venture. In so doing, they have placed all who are interested in the extended use of burned clay under lasting obligations.

The manufacturers immediately concerned were therefore in duty bound to discharge their part of this indebtedness by the exercise of special care and skill in the production of work of the highest attainable excellence. Those not directly engaged were likewise interested in the degree of success that might attend the final outcome of such an important undertaking. On that must depend whether this latest effort would be repeated by the same architects; also, whether it shall be imitated or avoided by others. The influences thus exerted form an ever-widening circle, creating or canceling future contracts in which they too would in due time have an equal chance of profit and distinction. True, there are short-sighted people engaged in the business who cannot see things in this light, but they are not likely to contribute much to the advancement of terra-cotta making. Some of these delinquents are quite incorrigible, and should be placed under restraint by common agreement between our leading companies, who have an undoubted right to safeguard a great and growing industry from discredit. There are lines of business in which reputable manufacturers fix a minimum standard below which none are allowed to go, under penalty of public exposure. Something of this kind would be of advantage to those who have invested large sums in plant, appliances, and in the payment of competent help; all of which are conditions precedent to the production of creditable work. We could, for example, mention a church or two which the manufacturers at large might, as a first step in the direction indicated, agree to rebuild at their own expense, and find it a paying investment.

Our first visit to the Rhinelander church came about under the circumstances already indicated; for although we had an abstract knowledge of its existence, we were not certain of the exact location. We had listened to the comments and criticisms of others on it and the adjoining St. Christopher's House, some of which came from men who have earned their right to a respectful hearing in any assemblage of clay-workers. This fact afforded additional zest to a discovery which would, in any event, have been highly interesting. Here was an opportunity — of which we have availed ourselves on several subsequent occasions — in which to form an independent opinion on the execution of a singularly bold conception in church architecture. Viewed as a whole, this well-ordered group of buildings is quite impressive, and to any one having a share in the execution of similar problems must possess a peculiar fascination. In matters of detail, too, the architects have acquitted themselves very creditably; for, while presenting features of some difficulty, they are, as a rule, well adapted to the capabilities, and nowhere exceed the limitations of the material.

The terra-cotta, which may be described as a mottled brown, was furnished by two well known companies; between whom, if we may judge from the merits of this particular work, there is no room for discrimination. After careful comparison, we would say that they stand on an equal footing, so far as subsequent remarks may apply to either or both of them. In point of absolute durability, the Rhinelander family has been fortunate in the material by means of which a respected name will be known to remote posterity. The memorial windows are leaded into tracery that will outlast the stained glass on which that name and other more sacred subjects have been emblazoned. Every block of it has been fired to vitrifaction, and some to an extent that has produced a metallic luster.

The brick used on these buildings are Roman size, of the well-known speckled variety, with a background that would be called "old gold" by those who offer them in exchange for an equivalent in that precious metal. They differ in color from a yellowish buff to a light brown, some of the intermediate tints being found on the same brick. When set in the wall with a little artistic irregularity, so as to avoid studied patterns on the one hand, and accidental patches on the other, these various tints become interspersed and blend into a harmony of color that is only surpassed by nature's inimitable autumn foliage. The late Charles Garnier, in his "A Travers les Arts," conjured up a day dream in which the tawny tones of gold would become universal in a city which he himself had done much to beautify; where harmonies of color were to tremble under the enchanted gaze of his fellow Parisians. Had he lived to visit and — of course — write his impressions of America, he would have found that the longings of a somewhat exuberant imagination were being realized very rapidly by plain, practical, prosiac brickmakers. Whatever may be said of an adverse character, in relation to the buildings in question, there can be nothing but praise for the brickmaker, whoever he may be, for on that point we have not the faintest idea.

Color combinations between brick and terra-cotta is a subject on which no hard and fast rule can be laid down. Good and bad taste are, no doubt, at the top and bottom of the scale, but when it comes to a question as to which *is* the top and which the bottom, everybody is armed with a declaration of independence. Even among architects and men of trained artistic perception the divergence of opinion is well-nigh irreconcilable. Where authorities differ so widely it would be a hopeless as well as a thankless task for others to intervene. On this branch of the subject we shall therefore venture a few general suggestions, without invidious reference to any existing building.

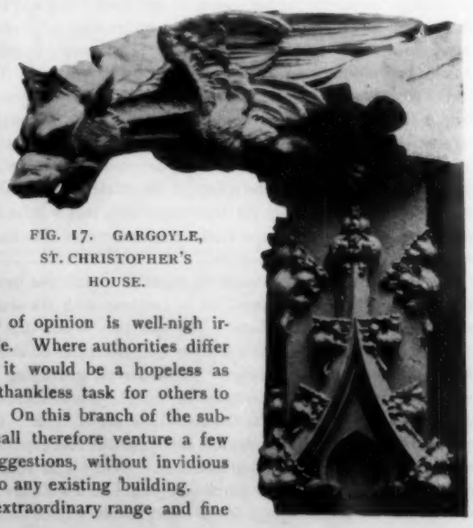


FIG. 17. GARGOYLE, ST. CHRISTOPHER'S HOUSE.

The extraordinary range and fine

gradation of color that have been produced of late years, whether by logical analysis, by repeated experiment, or as the result of accident, seems to have added an element of danger to an already doubtful situation. With less to choose from, a choice could be made without hesitation and with less room for subsequent regret. Not many days ago a business communication passed through our hands in which the writer gave what must have appeared to him a lucid definition of his requirements; for he ordered certain work to be made "a terra-cotta color." This, of course, was but an echo from a distant and almost forgotten past. But now, with an array of color ranging from dark chocolate to pure white, those who have a weakness for novelty are subjected to a degree of temptation that few of them can withstand.

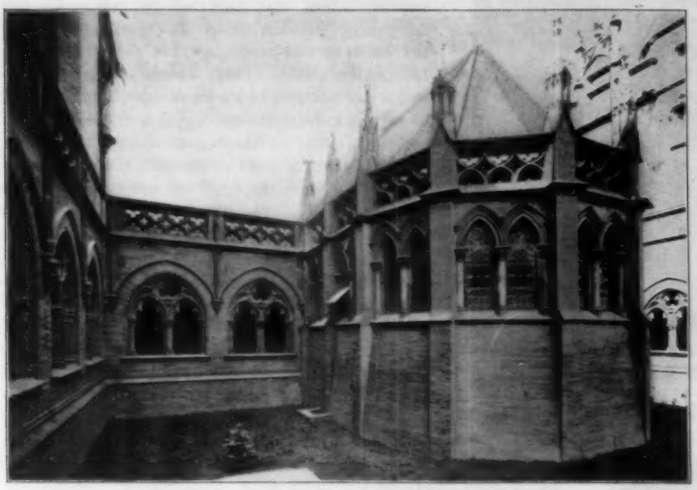


FIG. 15. MORNING CHAPEL AND PORTION OF CLOISTERS, CHURCH OF THE HOLY TRINITY.

In their selection of color, architects sometimes mislead themselves (and others) by placing two or more small tablets of terra-cotta side by side on an office table. In this they are liable to forget that any of these colors when seen in the mass at a distance, under other conditions of light, may produce an effect that will prove quite disappointing. They are likewise misled at times by specially prepared "samples," or such as have not been taken at random from a purely commercial output. These samples may not have been presented with that intention, but a certain allowance should always be made in judging from work gotten up for exhibition. The usually small size of such pieces, for example, admits of a fineness of body and a degree of finish that would not be thought of in the general run of work sent to a building. A few regular building blocks of average size, laid up along with the brick proposed to be used, is a good test when in doubt as to the effect of an untried combination. Perhaps the safest, certainly the least expensive, test will be found in a critical inspection of current work on which others may have experimented with more or less success.

Whether terra-cotta should be made to match the brick used in connection with it, or to stand out in contrast with its setting, often becomes a subject of debate. The question is one that cannot be settled without reference to the style and character of the building, its situation, and surroundings. These are the governing factors on which an intelligent decision must be based. Personally, we favor a contrast, but only in so far as the conditions are suitable. Gray terra-cotta and red brick is one of the few combinations that can be depended upon under almost any circumstances. White and red, however, is much too strong; unless, perchance, there be a wide lawn in front, with plenty of green foliage for a background. That harsh, garish, or discordant contrasts should be eschewed none will deny, as an abstract proposition; yet in the application of a simple truism we do not find the same unanimity. A harmonious contrast is always a center of life and cheerfulness, while a monotone is often lacking in these desirable qualities. The latter, however, is frequently preferred in buildings where a feeling of unity and sobriety is sought to be preserved. In churches, if anywhere, it is right that these characteristics should prevail over those that are unstable or meretricious.

At present the popular fancy runs to gray, though that shade was introduced originally less as a deliberate choice than with a desire to match limestone. It has stood the test of extensive use, for it is now accorded a preference on its merits, independent of other considerations, and in cases where stone does not influence its selection. The various shades of gray have given rise to a demand for brick to be used on buildings in which a sober monotone has been aimed at by the architect. We now see on every hand one or two stories in limestone, all above being brick and terra-cotta of so perfect a match that experts have failed to draw the line of demarkation. Indeed, so great has been the insistence of late on the matching of brick and terra-cotta, that it has been deemed advisable, in some instances, to order both from the same works. Pressed from the same clay mixture and burned in the same kiln, we get the nearest approach to perfection in uniformity of tone and texture.

The very latest and most pleasing variety of these shades has a dark speck running through it, produced by an admixture of manganese, which, acting as flux, has been found to improve the quality as well as the appearance of the goods. Viewed from an opposite sidewalk, the individual specks are hardly perceptible, but at shorter range they give a granular character to the surface that is usually sought after by tooling in imitation of stone. A plain gray placed side by side with speckled work of approximately the same shade looks flat and lifeless by comparison. The production of this crystalline texture may be considered among the most notable of recent steps in the direction of advanced practise. Its application to other colors than gray, more especially to such as may be used in connection with various shades of fire-flashed brick, shall receive such attention as the exigencies of space will permit.

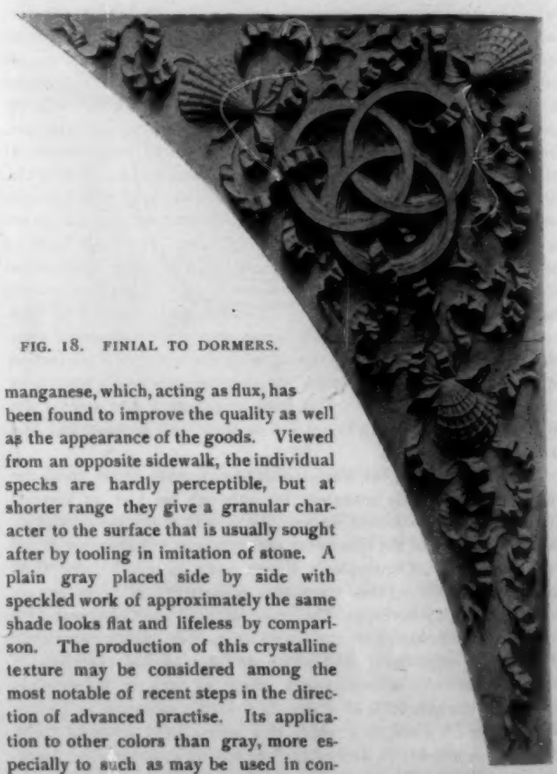


FIG. 18. FINIAL TO DORMERS.

Fire-proofing.

TEST OF WIDE FLOOR ARCHES.

BY CORYDON T. PURDY.

THE strength and general practicability of the 7 ft. arches called for in one of the alternative plans referred to by the writer in last month's issue of THE BRICKBUILDER were questioned.

At the suggestion of the architects, Messrs. Winslow, Wetherell & Bigelow, the Boston Fire-proofing Company proposed to have two such arches tested, one segmental and the other flat. Accordingly

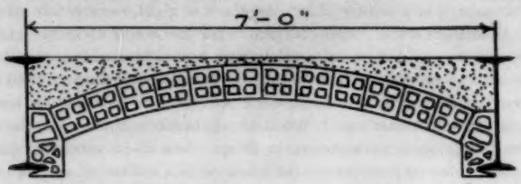


FIG. 1.

they erected inside of their factory at Boston a piece of floor 7 ft. wide and 16 ft. long carried on two heavy 15 in. beams spaced 7 ft. apart center to center. Eight ft. in length of this construction was made a 6 in. segmental arch, and the remaining 8 ft. was made a 15 in. flat arch. They were laid up with Rosendale cement mortar and covered to the level of the top of the beams with concrete composed of one part of Portland cement, two parts of sand and gravel, and three parts of cinders, with a thickness over the flat arch and over the crown of the segmental arch of about 1 in. The finished construction on top, therefore, looked like one arch. The beams were tied together with six tie rods ¾ in. in diameter, located 2 ins. above the bottom of the beams, one at the middle of each arch, and one near each end, as shown in Fig. 3. Both arches were made of semi-porous material. The tests were made under the general supervision of the writer by Mr. George Hill, of New York, with his hydraulic testing machine.

Fig. 1 shows the section of the segmental arch.

Fig. 2 shows the section of the flat arch.

Fig. 3 shows the arches in plan, with the position and area of the applied load, also the location of the tie rods, and tie bars, and the cracks in the arches.

Fig. 4 shows the openings in the 15 in. flat arch, and the thickness of the terra-cotta walls.

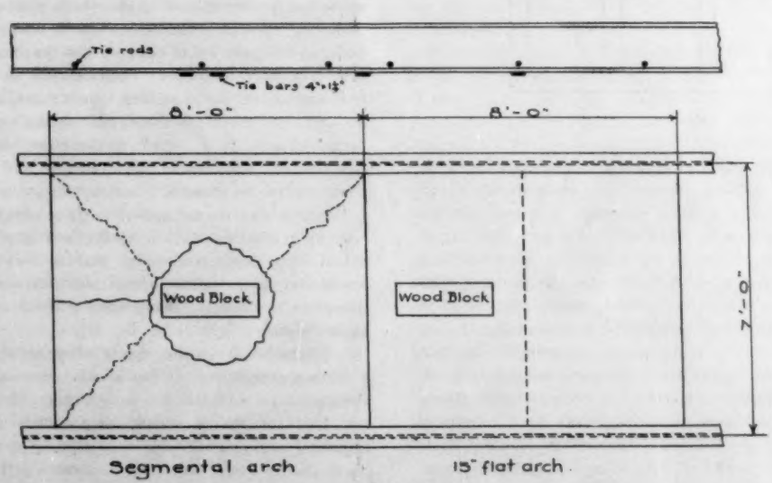


FIG. 3.

The voussoirs of the 6 in. segmental arch, which was tested first, measured 6 ins. in height, 6 ins. in width, and 12 ins. in length. They were placed in the arch so as to break joints transversely. The skewbacks were also 12 ins. long, and of the section shown in Fig. 1. The concrete over the arch was apparently hard and strong when the test was taken. Before it was made the weakness of the tie rods was noted and they were reinforced by two bars 2 by ½ in. in section, hooked onto the bottom flanges of the beams and only about 2 ins. apart. The load was applied to the center of the arch through a wooden block 10 ins. high, 10 ins. wide, and 2 ft. 6 ins. long. This block was placed parallel with the beams along the center of the arch, as shown in Fig. 3. The total weight of the block and packing, together with the plunger in the testing apparatus, was about 400 lbs.

The first attempt to test the arch was stopped by a misarrangement of the registers after a small load had been put upon the arch. When the test was finally made a load of 45,000 lbs. was first applied to demonstrate that the apparatus was in good working order, after which the load was immediately removed. A second load of 59,000 lbs. was then applied, when it became apparent that the 2 by ½ in. tie bars were also insufficient, and a crack developed in the

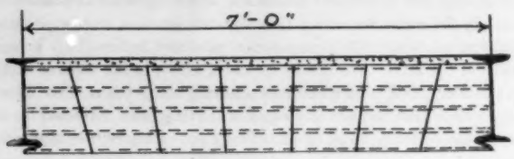


FIG. 2.

key joint of the arch on the under side. All the arch blocks, however, appeared to be unaffected. The load was removed and two 4 by 1¼ in. bars were substituted for the 2 by ½ in. bars. These are shown in their position in Fig. 3. After they were put in position the pressure was renewed. At 60,000 lbs. the concrete filling separated from the top flanges of the I-beams and cracked along the connection with the 15 in. flat arch adjoining, as shown in Fig. 3. At 62,000 lbs. that portion of the skews protecting the bottom flanges of the beams began to break off, and cracks appeared in the top surface of the concrete describing a circle of about 30 ins. in diameter, tangent with each end of the loading block, with an additional crack running from the end of the loading block to the end of the arch. The maximum load was reached at 64,000 lbs. Continued pressure resulted in increasing deflection and rapidly decreasing load, with all cracks opening materially. When the load had decreased to 32,000 lbs. it was removed entirely. After a careful examination of the arch, the load was reapplied and run up to 31,000 lbs., when with increased pressure the load began again to recede, the arch continually failing. The soffit of the arch had cracks extending to the corners of the arch from three points immediately under the corresponding corners of the loading beam. In some cases these cracks occurred diagonally through the blocks and in others they followed the joints in a zigzag line. At the end of the arch the blocks showed cracks paralleled with the soffit of the arch a little above the center. Mr. Hill states that all of the blocks were practically destroyed except in the angles at the ends of the loading block.

The blocks forming the 15 in. flat arch were each about 1 ft. in length, as shown in Fig. 2. The skewbacks were similar in construction to the voussoirs, molded on end to fit the flange of the

beam. In order to reinforce the tie rods, one of the 4 by 1¼ in. bars was put in place at the end of the arch where it joined the segmental construction, while the other was put in the center. As the soffit of the arch projected in the usual way below the bottom of the beams, it was necessary to cut away the entire soffit wall of the arch where it interfered with the tie bar, and the arch was then tested as though this had really cut the arch in two, leaving a good part only 4 ft. long between the tie bars.

The test of the arch was then conducted in the same way as that on the segmental arch. The pressure was uniformly applied up to 73,000 lbs., at which load some high spot of the jointing gave way, causing an increase of deflection without an increase of load. As soon as the blocking came to a new bearing the load increased to 76,000 lbs. and remained practically constant with constantly increasing deflection for about two minutes, when a sudden drop of 5,000 lbs. occurred with a momentary recovery, followed by a rapid failure of the arch. No cracks appeared either in the soffit or on the top surface. The failure came by shearing along the true arch lines.

Neither arch showed any signs of having been distorted by the center bearing load. The circular crack in the top of the segmental

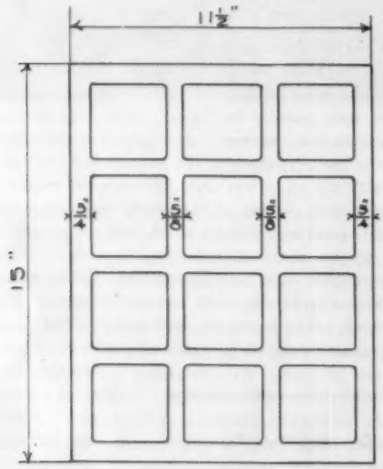


FIG. 4.

arch seems to be the result of direct crushing immediately under the loading block, while the radiating cracks in the soffit mark the boundary of the arch area actually resisting the load. On one side the material was strained, while on the other side it was not. The 64,000 lbs. on the segmental arch divided by the 56 sq. ft. of its whole area equals 1,142 lbs. per foot. The 76,000 lbs. on the flat arch likewise equals 2,714 lbs. per square foot over its whole area of 28 ft. It seems to the writer that it may properly be presumed that the unloaded half of the flat arch was some source of strength, and that this rate is really somewhat higher than it properly should be to be a fair measure of the strength of the arch; but a comparison between the two rates as well as the cracks in the segmental arch, especially those in the soffit, indicates quite clearly that if the loading block had been 7 or 8 ft. long instead of 2 ft. 6 ins., the former rate of 1,422 lbs. for each of the 56 sq. ft. of the segmental arch would have been much greater.

It must not be forgotten that if the material will stand the shear, the arch will stand a much heavier evenly distributed load than one applied only at the center, theoretically twice as much, and therefore an equivalent evenly distributed load would be twice as great or nearly so. However, without taking that into account, the arch is clearly much stronger than the beams, and stronger than needed in actual practise. It would also seem that the test ought to put to rest any question as to the strength of 7 ft. arches.

Masons' Department.

SOME EVILS OF PRESENT SYSTEMS.

(Continued.)

BY JOHN LYMAN FAXON.

IN regard to (*e*), sub-contractors are too apt to claim "the right" to estimate in an architect's office, or from his plans and specifications: it is a matter of privilege, not of right,—except in cases of advertised work. And contractors for the whole claim the right to have any one bid on sub-work: some contractors asking or allowing subs to estimate, to whom they haven't the slightest intention of awarding the work, this being done so that such bids may be used to dicker with better men. While the general contractor is responsible for all work, nevertheless, in these times, when sub-work often approximates 50 per cent. of the whole, it is a matter of serious importance to the architect to be sure of the standing and ability of the subs who are to execute the work under his supervision,—often work of most important character and requiring considerable direction and supervision at the best, and it is the architect's duty to approve of only those subs who know what thoroughly good work is and who will execute it faithfully. If general contractors gave the personal supervision to sub-work which contract obligations require, and would see that it was properly executed, the objections to indiscriminate sub-bids would be materially modified.

As to (*f*), when a general contractor has put in a bid, based upon the bids of reliable subs known to and approved by the architect, the contractor has no right to trade and dicker with other subs; such practise is a breach of good faith all around. The architect awards the contract, and the client *pays for work* on the basis of bids and work by certain subs, and the client is entitled to the reputation, reliability, and work of such subs, and the subs are entitled to the work and for the amount of their bids without scaling down. If all dickering in subs could be forthwith abolished, the status of the building business would be quite for the better. Contractors claim that they have to dicker, "because they all do it"—and because bids are cut so fine that they "can't make any money if they don't do so"; but this does not appear to be a sufficient excuse for a breach of good faith. And, on the other hand, if subs would make fair bids for work, stand by their bids and refuse to dicker, they could control the abuse in a few months. One trouble in this respect is that the subs do not appear to have anything like an even judgment as to what sub-work is worth; there is more variation in amounts of sub-bids, considerably more, than in bids by contractors for the whole, and as a rule the lowest sub-bids are too dangerously near cost price to promise honest work without unpleasant distrust and supervision.

In respect to (*g*), the agents of materials are responsible for a good deal of mischief. "Business is business," to be sure, in a right and legitimate way, but why an architect, after he has specified certain kinds or makes, should be troubled with from one to fifty agents, all urging something "just as good or better," or why agents go to clients when they cannot prevail with the architect, passes comprehension. Agents ought to understand that when an architect specifies a certain thing, it is quite likely that he has done so with due thought and selection, and that he is quite likely to specify something else in another case; in any event, agents should not attempt to interfere with or to undermine the architect's choice and judgment, or to euchre their fellows out of business duly provided for.

In regard to (*h*), what I have said in the first paper covers the point. I would only reiterate in substance, that the practise is unbusinesslike, immoral, and open to no excuse or justification.

In regard to (*i*), it sometimes appears as if contractors laid awake nights to exercise an abnormal ingenuity in concocting schemes for extras and omissions; certain it is that many of the schemes or excuses they offer evidence a fertile imagination and utter disregard of contract obligations. This, I have no doubt, is largely due to the practise of cutting down bids to the lowest notch to get the job, and the resultant effect on profit and loss. When contractors bid on work on the basis of honest work at a fair price, the vexatious questions of extras and omissions and "let ups" will be reduced to lowest terms and legitimate matters. On the other hand, owners are not without fault in this: the tendency, of late years especially, to get something for nothing, to get as much as possible for the least sum, has so permeated all lines of business, that the idea is sometimes carried to extreme lengths, and the contractor, anxious to secure work, is enticed into taking contracts below cost, unmindful of obligations and responsibilities so assumed. Owners are pretty sure to lay blame upon contractors or architects, in case the work does not come up to their expectations. Owners, take them by and large, know comparatively little of the art of building; they do know something of results, relation of cost to per cent. of income, repairs, etc. If a foundation settles and the building cracks, or the roof leaks, or the elevator gets out of order, or an electric wire sets the building on fire, the owner does not know just what causes bring these defects about; he does know the defects exist and naturally charges them to poor judgment on the part of the architect or to skin work on the part of the builder, unmindful of the fact that he may have influenced the contractor to propose a low bid for the contract and has already received more than his money's worth.

Modern advance in requirements of construction operating plants, finish, conveniences, etc., while of less cost, proportionately, than fifteen or twenty years ago, are much more complicated and extensive, cover a larger field, and require more scientific application and higher type of installation and adjustment, more exact efficiency and more rigid requirements in supervision of building operations, and proportionate cost; (*i. e.*, contract compensation). The best results all through will always be obtained when the architect is master builder also of the building which he has designed; this would undoubtedly, in some cases, involve something of additional cost, but I am quite of the opinion that the results would be most satisfactory and justify the expense, and in some cases the cost would be less than by contract; this has been my experience.

There is a wide difference of opinion as to what constitutes a fair price for extras or omissions. Contractors, as a rule, claim all they think they can get for extras, and allow as little as possible for omissions, and owners *vice versa*. Some contractors ask what it "costs them" to do the extra work, plus 10 per cent. to 15 per cent., and offer to allow what they "figured on it," minus the profit, for omissions, and the architect is vexed with such questions to an extent much beyond what he is paid on said accounts.

The only basis which seems to be fair for extras and omissions is the actual reasonable *net* cost of labor and materials *necessary* for the work, in either case, plus a fair profit, as may be agreed upon, mutually or otherwise, or by general acceptance. The per cent. of profit to be allowed, over actual cost of extras and omissions, might well be established by the Master Builders' Association, also said association might issue *monthly* schedules of *net* market rates, embracing all materials used generally in contract or job work and going wages, the schedule varying according to the variations of market rates, and such schedules would be of much assistance and of value in the making up of bids.

But aside from such established schedules, the cost of work will vary with individual contractors by reason of brains, experience, systems, credit, etc., or the lack of these. And inasmuch as the contractor will not admit that the owner will be right in asking the contractor to do work for nothing or at an excessively low price, because the cost to the contractor is little or nothing, from one cause or another, so the contractor cannot in fairness ask the owner to pay an excessive price, because it cost the contractor a needless and excessive amount from lack of proper system, credit, etc., in the conduct of his business.

Another point which should be carefully observed by contractors, both general and subs, is not to go ahead and do *extra* work without a definite understanding as to its nature and cost, and a written order for it at time of change as fixed by the architect, while such matters are fresh in mind, and the same applies to omissions. Contractors are apt to neglect this point, either from negligence or from an absurd feeling that the architect will feel offended if his oral directions are questioned, as implied by asking for a written order. Such feeling is a mistake, for I venture to say that architects prefer to have such matters fixed at the time, and thus avoid unnecessary misunderstandings at final settlement. Architects should bear in mind that the fixing of such matters at the time is a duty not only to clients, but to contractors as well; and contractors should bear in mind that "extras," without a written order for the same, are not valid.

In regard to (*j*), the most potent factor in matters of cost and loss of profit to contractors is a lack of *system*. I have seen some contractors fritter away the profits on a good job, and more, too, where they might have made good money, with due regard to business methods.

Space does not admit of my going into details. One of the fundamental rules which contractors should keep in mind is, "Spare no expense to economize," and one of the first considerations of economy is to find out just how the architect wants the work done, and with what materials, and then go and do it, and do it right the first time, and save doing it over again. The best workmen at best pay are the cheapest, and a high-salaried foreman to lay out and direct the job (and do nothing else), and who can read the plans intelligently and keep ahead of them, is a mighty sight cheaper than a low-priced man, who will rattle around the job and "help lay bricks," and there should be *one* foreman on the work to oversee all work, and not a half dozen with conflicting directions. Keep an accurate account of stock, day by day; don't waste it, and *don't let it run short*, and don't have stock delivered different from that specified. I have had dealings with a contractor who knew every morning just how much stock he had on each job, of each kind, and he conducted a large business. His men never waited for stock and consequently wasted no time puttering around, and the right kind of stock was always on hand. Keep the job *cleaned up;* piles of broken bricks, dirt, and general débris should not be allowed to accumulate for an hour for men to stumble over or pick their way around. Much time and money are wasted in the careless and negligent manner in this respect which characterizes the majority of work. Three or four laborers to keep the job clean and walks in shape will profitably save the time of thirty to forty workmen, and especially if the laborers are employed at night, so that the work is free and clear for a start in the morning. House *all* stock, especially in cold weather. It takes more time to properly granulate the frost lumps in sand than it does to protect it, and it costs less to neatly pile bricks than it does to chuck them in a heap and have 5 to 10 per cent. of broken stock, and the best stock in the majority of cases (even when not called for) is the cheapest in the end. Flights of rough stairs, from stage to stage, or from story to story, are cheaper than ladders. In Italy, where I have observed much work (and where time does not count as it does here), runs are provided, and the ease and quickness with which laborers swarm over a building is remarkable. Provide for sub-work at the start; don't wait till it is wanted; have it on the job when needed, and have it done right at first. A sub-contractor should understand that his work is expected and required at the building, at a certain day and hour, and that he is to have it there, with sufficient men to place it in the shortest possible time consistent with the best work. No sub-work should be given out without a written contract, stating time of delivery and finish and forfeit for delay. The usual delay in sub-work is a matter of constant and increasing vexation to contractors and architects, and of material loss to contractors and owners.

Brick and Terra-Cotta Work in American and Foreign Cities, and Manufacturers' Department.

NEW YORK. — The vacation season is here, and, consequently, a lull in transactions of importance in the building world. We have been told by one of New York's oldest and most prominent builders that this is the best year for the building trades since 1890. Almost all the builders have enough to do, and many have refused to bid on any new work. The only trouble now is the difficulty in finding enough skilled mechanics. We asked this same builder whether, in his candid opinion, it would be wiser and safer for investors to wait until fall before beginning new building operations, in the hope that the high cost of materials would drop to the low prices charged during the fall of last year, and also whether contractors will not always figure lower in the fall, because there is less work to do, competition keener, and because enough work must be secured to keep the men busy during the winter. In reply he said that he thought there would be so little difference in prices next fall that it would not be worth while to subject oneself to the annoyances, inconveniences, and delays incumbent upon building in the winter, especially as the country is now in so peaceful a state and prosperity on every hand seems to be so well established that good prices will continue.

It is the intention of the government to make the new Custom House in Bowling Green one of the finest buildings in the country. Twenty competing architects are now busily engaged on their designs, which must be submitted to the Treasury Department not later than September 18. It will be seven or eight stories high, and cost about $2,750,000. The lot is so situated that the principal architectural fronts will be in Bowling Green and State Street. The first floor will be level, or nearly level, with the sidewalk, with elevators and staircases convenient of access.

It seems a strange coincidence that the new Custom House should return to the old site of the Government House, once in Bowling Green, which was used as a Custom House in the early days of New York. The Government House was built for Washington, and was occupied by Governors Clinton and Jay.

After more than a year of quiet on lower Broadway, we are now to have two new "sky-scrapers." They are to be built on opposite corners of Broadway and Cedar Street, one being the building for the American Exchange National Bank, Clinton & Russell, architects; and the other for the Niagara Fire Insurance Company, Bruce Price, architect. H. J. Hardenbergh has planned a thirteen-story brick and stone fire-proof hotel, to be built on 45th Street, west of Fifth Avenue. W. Wheeler Smith has prepared plans for an eight-story fire-proof store and loft building, to be erected on Varick Street; cost, $80,000. C. F. Miller has planned three seven-story brick, stone, and terra-cotta flat buildings, to be built on Lenox Avenue, corner of 111th Street; cost, $135,000. Henry R. Marshall has prepared plans for a five-story brick and stone dwelling, to be built on 50th Street, for E. Morgan Grinnell. Charles Rentz has planned two six-story brick flat buildings, to be erected on 10th Street; cost, $100,000. Carrere & Hastings are preparing plans for a two-story brick office building, to be erected on South William Street, for Chutt & Meyers. Robert Maynicke has prepared plans for a ten-story brick loft and store building, to be erected on Fifth Avenue, between 18th and 19th Streets; cost, $550,000. Charles Brendon has planned eight four-story brick and stone dwellings, to be erected on 49th and 50th Streets, near Park Avenue; cost, $172,000. Hill & Turner have prepared plans for a five-story brick flat building, to be erected on 26th Street; cost, $50,000. C. P. H. Gilbert has planned a five-story brick and stone dwelling, to be built on Riverside Drive; cost, $80,000.

BARNARD COLLEGE, NEW YORK CITY.
Lamb & Rich, Architects.

COURT, BARNARD COLLEGE, NEW YORK CITY.
Lamb & Rich, Architects.

CHICAGO. — A municipal art league is soon to be an active factor in the making of a more beautiful, or perhaps it were better to say, for the present at least, a less ugly city. The preliminary meetings have been attended by some of the best known members of the artistic and architectural professions, and by several prominent and public-spirited citizens. The organization will soon be perfected, and will be ready for active work at the close of the vacation season, when a campaign against big billboards, signboard eyesores, the smoke nuisance, etc., will doubtless be begun and carried on until permanent results are accomplished. There is plenty of strong public sentiment in favor of radically improving the city from an æsthetic point of view, but it needs the active, untiring leadership of a strong organization. The architects' and artists'

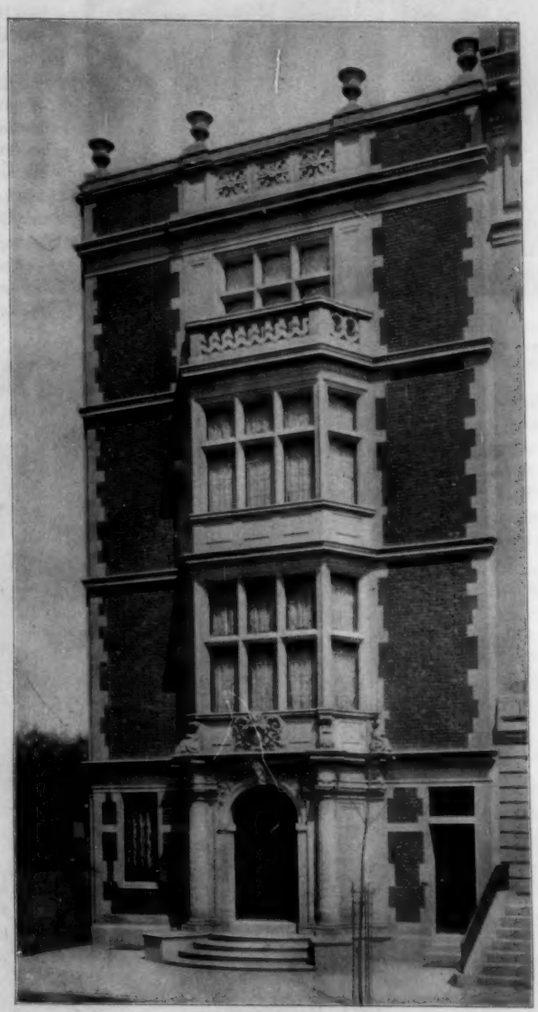
clubs have lacked power in this direction, because made up entirely of professional men who have been chiefly active in other, though perhaps kindred, directions. It is believed that an organization which includes in its membership a large and representative body of men and women not actively engaged in artistic pursuits, yet jealous of Chicago's artistic reputation, will be strong and influential enough to awe and subdue in time the worst offenders against decency in form and color in our thoroughfares and public places.

In line with the present universal desire for a better municipality,— for making the most, though tardily, of our opportunities,— comes the announcement of the program for the Chicago Architectural Club's competition for the Illinois Chapter (A. I. A.) medals, to be opened in September and closed in time for the spring exhibition of 1900.

The program as outlined requires the designing of a new city hall and educational building on the lake front, between the Art Institute and Randolph Street, together with a monumental building or buildings at Randolph Street, on the private properties there; also a subway east of the proposed "Municipal Court," to carry the boulevard system across the river, and an additional feeder to the Randolph Street viaduct, from Washington Street, which crosses the subway. The problem of improving and beautifying the lake front, the river, and the river surroundings, and of solving the bridge question satisfactorily, is a big one, and it is to be hoped that the competition will at least result in some original and happy suggestions. It may be doubted, however, if it would not be better to omit from the problem the planning of the proposed new public buildings, and to require general suggestions only for their masses and treatment, showing their place in the grand scheme.

Local architectural engineers seem to be inclined to abandon the steel and concrete "raft" system of foundations in favor of piling driven down into hard pan. Two recent examples of this tendency toward securing solid, non-compressible bearings for large structures are the Methodist and Cable Buildings. Piles are now being driven for the latter. The foundations of the Methodist Building, now completed and ready for the superstructure, are unique, and promise to be very satisfactory. They consist of circular concrete pillars, 80 ft. deep and 4 ft. in diameter, with expanded bases 8 ft. in diameter, in a very dense hard pan. The excavation was accomplished with the help of sectional caissons, no supports being required in the hard pan. The surface friction of the pillars, in addition to their solid bearing, will, it is expected, preclude the slightest settlement. Mr. H. W. Wheelock is the architect.

The use of concrete in this manner as a substitute for wooden piling would seem to be especially advantageous in all similar cases where adjoining tall buildings might be jarred or caused to settle by pile driving. Moreover, notwithstanding the well-established durability of wood under water, it does not seem as fit a support for a steel and masonry structure as does concrete. The building on piles stands on wooden stilts; the other literally is founded upon a rock.



HOUSE NO. 1, EAST 76TH STREET, NEW YORK CITY.
Brite & Bacon, Architects.
(Drawings shown in plate form.)

PITTSBURGH. — In view of the immense increase recently in the iron and steel business in Pittsburgh, we might expect more promising building operations, for usually with the iron and steel business brisk business generally is good. Whatever the cause, it is a fact, however, that there is little new work coming on in architects' offices. The iron and steel business is almost unprecedented, and many concerns have called in their salesmen and are not seeking orders, and many are building large new plants. The Westinghouse Company, which is reported to have orders ahead to run their shops two years and a half, are making large additions, and also building a large five-story office building at East Pittsburgh. The cost of their improvements, without equipments, will amount to nearly a million dollars. The Carnegie Steel Company and the Schoen Pressed Steel Company are also installing large plants, the Carnegie Company expending a million on one new plant alone.

Bids have recently been received for adding four stories to the Westinghouse Building. This building was one of the earliest of the high buildings built here, and while fire-proof, so called at that time at least, is built with solid walls. The walls and foundations were found inadequate during the course of construction, and a most peculiar cut was made on the front to lighten the weight, but this did not prevent several large cracks from making their appearance. A curious fact also learned recently in connection with this building is that while steel or iron columns were used in the interior, the floor beams and girders are not connected to them, but simply rest on them. The effect of four stories more will be awaited with interest.

The removal of the hump on Fifth Avenue seems to have been dropped for a time at least. One of the principal obstacles in the way of this improvement seems to be in the question what to do with St. Paul's Roman Catholic Cathedral, the congregation naturally objecting to having the first floor left 25 or 30 ft. from the street level, and until a purchaser can be found for this property, which, by the way, is one of the best sites to be had in Pittsburgh, there is little likelihood of this work being done. The destruction of this building would, on the other hand, be a matter of regret, as it will be remembered by all who have seen it as one of if not the most

BERZELIUS DORMITORY, NEW HAVEN, CONN.
Brite & Bacon, Architects.
(Drawings shown in plate form.)

interesting brick building in town. The fact, however, that it was given a coat of white paint some time ago would reconcile us in some degree to its destruction.

Competitions recently held have been for the Allegheny Observatory, to be built in Riverview Park, for the Western University of Pennsylvania, awarded to T. E. Bilquist; and for St. Paul's Orphan Asylum, awarded to Edward Stolz.

Alden & Harlow are preparing plans for a Carnegie Library, to be built at Duquesne; cost, $250,000. T. E. Bilquist has the new Edgewood Deaf and Dumb Orphan Asylum. Charles Bickel has prepared plans for a seven-story store building. F. C. Sauer is planning the Tenth Ward School for Allegheny City; cost, $80,000.

AN INTERESTING NEW CATALOGUE.

IN designing and building a house or other structure of wood the architect and contractor are allowed, on account of the ease with which the subject material can be worked, the greatest freedom in the choice and execution of ornamental details. With other materials the possibilities of ornamentation are much more limited on account of the difficulty and expense attending the making of moldings and the carving of enriched work. With stone there is still a large field for the skill of the designer, particularly in the softer granites, limestone, and marble, and much commendable work is added yearly in these materials to American architecture.

With brick construction, which is every day growing in popularity and use, the case is entirely different, because, with the great hardness of a first-class brick, and the soft mortar joints between them when laid in the wall, it is practically impossible to do any carving on a brick front, or even to cut moldings out of bricks themselves before laying, except possibly in a very limited way, and in soft and most undesirable kinds of bricks. The use of ornamentation, therefore, in bricks, requires the pressing

NUNUPTON, HEREFORDSHIRE, ENGLAND.

NUNUPTON, HEREFORDSHIRE, ENGLAND.

of the soft clay in molds to the desired shape, and the drying and burning in a kiln.

The proposition of making *specially shaped bricks to order* involves many difficulties. In the first place, several weeks' time is required by the process, which is therefore not always practical. Then there are difficulties of burning to the right color, the correct size, with straight lines and true surface free from cracks and other defects, all of which entail much trouble, and often require the remaking of some or all of the *special bricks*, with a corresponding expense and delay. All of these considerations have conspired to confine the use of brick ornamentation largely to a class of buildings where expense and trouble were of little consequence compared with the finished effect, and have prevented it from becoming popular for general use. As a result, one much oftener sees stone trimmings on a brick front than ornamentation made of the bricks themselves.

Within a few days we have received the ad-

vance sheets of a catalogue illustrating a line of molded bricks manufactured by Fiske & Co., managers, which we think deserves more than a passing notice. Not only does it illustrate the most complete line of molded bricks which we have yet seen catalogued, but it contains information particularly valuable to the designer, and in which molded brick catalogues have usually been lacking.

Some three hundred different molds are illustrated, covering almost every detail of ornamental construction necessary in the ordinary building. Many sketches giving suggestions for different constructions, such as architraves, belt courses, panels, pilasters with caps and bases, and so on, are shown; but what is of far greater importance to the designer is the fact that full details and dimensions are given on every piece, so that nothing is lacking to enable the architect to use the designs in the composition of whatever subject he may have in hand.

Thus, on each piece will be found not only the length and thickness, but the *bond* and the *projection;* and being drawn to scale, the size of the ornamental details can easily be obtained. The brick thus represented are those made by the mud process. Fiske & Co. manufacture by this method only.

The catalogue illustrates a line of moldings which are either constantly on hand in certain well-chosen colors, or for which dies are ready for immediate production, and which, being standard patterns, are made up in large quantities, from which the right color, shade, and perfect pieces may be selected for a given job.

While some objection may be raised by critics that these, being "stock patterns," do not allow the architect enough latitude in the design of his building, it should be remembered that it is in the treatment of standard materials that the architect generally develops his individuality, rather than in the selection of some unique material or peculiar shape, and while for special work special shapes may be desirable, the number of combinations, each with its own individuality, which can be made up with such a catalogue, is easily understood by the practised designer.

We believe that the building profession is to be congratulated upon this new acquisition to the already large list of available material for ornamentation of modern buildings.

While it is not the intention of the company to send out these catalogues promiscuously, yet they will be glad to distribute them among those of the architects who are interested in a work of this kind. Parties desiring a copy should address Fiske & Co., 164 Devonshire Street, Boston, Mass.

CHESEBROUGH BUILDING, BATTERY PARK, NEW YORK CITY.
Built of cream-white bricks, made by the Powhatan Clay Manufacturing Company.
Clinton & Russell, Architects.

DETAIL, OPERA HOUSE, DETROIT, MICH.
Executed in terra-cotta by the Northwestern Terra-Cotta Company.
Mason & Rice, J. M. Wood, A. W. Chittenden, Associate Architects.

MANUFACTURERS' CATALOGUES AND SAMPLES DESIRED.

THE following-named architects would be pleased to receive manufacturers' catalogues and samples: Sylvain Schnaittacher, Adams Building, San Francisco, Cal.; John Stafford White, Chemical Building, St. Louis, Mo.

CURRENT ITEMS OF INTEREST.

THE ATLAS CLAY MATERIAL COMPANY, through their agents, H. E. Fuller & Co., are furnishing and setting the terra-cotta fire-proofing for a large apartment building on Leverett Street, Boston.

BRYANT & KENT, 30 Kilby Street, Boston, are now acting as the special Eastern agents for the "Brooklyn Bridge" brand cement, manufactured by the New York and Rosendale Cement Company. Over 60,000 bbls. of this cement have been sold in the New England market since the first of May through this agency.

THE following buildings are a few of the many recently equipped with the "Bolles" sash: Public schools, No. 19 and No. 16, Buffalo, N. Y.; six public schools, Greater New York; Kings County Hospital, Brooklyn, N. Y.; addition to store of John Wanamaker, Philadelphia, Pa.; and the Empire Building, Pittsburgh, Pa.

THE C. P. MERWIN BRICK COMPANY, Berlin, Conn., report very heavy business secured through their agents, the Central

INTERIOR, CHURCH OF ASCENSION, PITTSBURGH, PA.
Finished in light buff brick, furnished by the Kittanning Brick Company.
Halsey Woods, Alden & Harlow, Architects

New England Brick Company, of New Britain, on orders for both hollow and common brick. They have recently enlarged their plant and can make and ship brick to order very promptly.

WALDO BROTHERS, agents for the Perth Amboy Terra-Cotta Company, have secured the contract to supply the terra-cotta for the Whiting Building, Kingston Street, Boston, Woodbury & Leighton, contractors; also to furnish the terra-cotta for the Milton, Mass., Academy Building, Winslow, Wetherell & Bigelow, architects.

J. C. EWART & CO. are furnishing their Akron Roofing Tile for the carriage house of P. D. Armour, Jr., Chicago; for the Simmons Memorial Library, Kenosha, Wis., D. H. Burnham & Co., architects; for the superintendent's building, Oak Hill Cemetery, Evansville, Ind.; for a railroad station at Victor, Col.; for the Frostel residence, Milwaukee, Wis.; for a fire-engine house, Allegheny, Pa.; and for a high school, McKeesport, Pa.

BURGY & MCNEILL, Pittsburgh, report a shortage in all classes of brick in their city. They have orders booked for over a million red and fancy shades of front brick, and find difficulty in supplying the demand. They state that the cause of this unprecedented condition in the Pittsburgh brick market is due to the great activity in the building industry in that city, which exceeds in volume anything before known there.

THE PITTSBURGH TERRA-COTTA LUMBER COMPANY have, through their Eastern representative, E. E. Nickson, closed contracts to furnish the fire-proofing for the following buildings: Hotel Terminal, Boston, Arthur H. Bowditch, architect; Boston Dispensary, Boston, Peters & Rice, architects; Pawtucket Library, Pawtucket, R. I., Cram, Goodhue & Ferguson, architects; residence for R. S. Bradley, Boston, Little & Browne, architects.

TERRA-COTTA DETAIL, HARTFORD TIMES BUILDING, HARTFORD, CONN.
Executed by the Conkling-Armstrong Terra-Cotta Company.
A. W. Scoville, Architect.

WALDO BROTHERS are supplying Atlas Portland and Hoffman Rosendale cements for the Metropolitan Water Works at Spot Pond, Stoneham, Mass. They are furnishing Meier's Puzzolan Cement for the stonework in the building now being erected at the corner of Washington and Bedford Streets, Boston; Peabody & Stearns, architects; Norcross Brothers, builders. Also, the Welsh quarry tiles for floor work at Randall Hall, Cambridge, and Pumping Station, Chestnut Hill Reservoir.

H. E. FULLER & CO., Boston, report that they are furnishing the architectural terra-cotta for the Steiger Block, Holyoke, Mass., G. P. B. Alderman, architect; for the Masonic Block, Brockton, Mass., J. W. Beale, architect; for the Old Ladies' Home, Fitchburg, Mass., H. M. Francis, architect; and for a public school building, Somerville, Mass., Prescott & Sidebottom, architects.

THE CONKLING-ARMSTRONG TERRA-COTTA COMPANY, through their Eastern representative, E. E. Nickson, have closed contracts to furnish the architectural terra-cotta for the following buildings: Additions to the Slater Villa, Newport, R. I., Peabody & Stearns, architects; residence for H. H. Cook, Lenox, Mass., Peabody & Stearns, architects; St. John's Church, East Boston, Mass., Martin & Hall, architects, Providence.

BRACKET USED ON RESIDENCES, 108TH STREET, NEW YORK CITY.
Work executed by the New York Architectural Terra-Cotta Company.
Janes & Leo, Architects.

THE CELADON TERRA-COTTA COMPANY, LTD., have secured contracts to furnish their roofing tile for the following buildings: Billiard hall, for A. C. Burrange, Cohasset, Mass.; Frederick N. Reed, architect. Office building, Raritan Copper Works, Perth Amboy, N. J. Library for R. B. Raney, Raleigh, N. C.; C. M. Cassell, architect. Residence for James J. Mossers, Allentown, Pa.; Jacoby & Weishampel, architects. Phelps Medical and Surgical Sanitarium, Battle Creek, Mich.; Robert B. Newbury, architect. Residence, Mrs. Amelia Schlosser, Chicago, Ill.; W. A. Otis, architect. Township High School Building, Evanston, Ill. Residence for E. M. Young, Allentown, Pa.; Jacoby & Weishampel, architects. Summer house for D. R. Willard, South Hanson, Mass.; Frederick N. Reed, architect. Two houses for Adrian Iselin, New Rochelle,

N. Y.; Percy Griffin, architect. Hoagland Memorial Church at Dover, N. J.; Paul G. Botticher, architect.

THE TIFFANY ENAMELED BRICK COMPANY report that they have just received an order to furnish their white enameled brick for the front of the Tribune Building, Minneapolis, Minn., Frederick Kees, architect. The building will be handsomely trimmed with enameled terra-cotta. They also state that they will serve their cream enameled brick for the large court of the new Marshall Field office building, corner Court and Park Streets, Chicago, D. H.

TERRA-COTTA CAPITAL.
Made by the New Jersey Terra-Cotta Company.

Burnham & Co., architects; their dull finished white enameled brick for a building front at Booneville, Mo., Samuel W. Ravenal, architect; and a similar material for the front of E. T. Mithoff's new building at Columbus, Ohio, C. A. Stribling & Co., architects. These brick are identical with those used last year by Mr. Mithoff in the Betz Building at Columbus.

THE LUDOWICI ROOFING TILE COMPANY have recently issued a small pamphlet setting forth the distinct advantages afforded by the use of their terra-cotta tile on iron framing for the roofing of industrial buildings, where it is essential that the roofs shall be at once efficient, durable, and fire-proof. Particular claim is made for the slightly absorbent qualities of their tile, as providing against the annoying drip incident under certain conditions of condensation to all other non-absorbent roof surfaces. A brief description is given of the sizes, weight, etc., of the tile, its interlocking principle, and the proper manner of laying same on roof. To render this last being more readily understood, the book contains two full-page illustrations; one being a scale drawing of a roof showing the iron construction and the manner of applying tiles without sheathing or book tiles; the other being an interior view of the Chicago Electric Light Station, showing the under side of these tiles when roof has been laid.

THE OHIO CERAMIC ENGINEERING COMPANY, of Cleveland, has enlarged its plant twice during the last eighteen months, and we are now in receipt of information that it has, within the last month, purchased an entire building adjoining, for the purpose of adding to the capacity of its present establishment. This addition more than doubles the floor space, and, as the company has already made arrangements to fill the additional space with machinery suitable for its requirements, it is needless to say that it will be in a much better position to handle its business than heretofore. From Mr. Robinson, the president of the company, we learn that business has been steadily increasing, and that the enlarged plant has become an absolute necessity to enable the company to properly care for its customers' wants. The company is now in a position to furnish anything in the line of machinery for plastic work.

THE following letter was received by the Tiffany Enameled Brick Company and speaks for itself regarding the desirability of using enameled brick for exteriors in cities afflicted with the smoke nuisance: —

CHICAGO, June 10, 1899.

TIFFANY ENAMELED BRICK COMPANY,
MARQUETTE BUILDING, CITY.

Gentlemen: — We wish to tell you how greatly we are pleased with the enameled brick front on our branch store at South Chicago. We erected this building in 1893 and used enameled brick as an experiment, and we have been delighted with the result. They make a very handsome front in the first place, and the ease and cheapness with which the brick can be cleaned makes them especially desirable for smoky cities like Chicago. You are at liberty to refer any one to us regarding your brick, should you care to do so.

Yours very truly,
GEO. B. CARPENTER & CO.

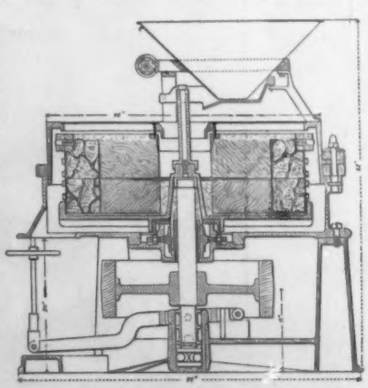
THE ATLANTIC TERRA-COTTA COMPANY is now supplying the architectural terra-cotta for the following buildings: Terminal Hotel, Atlantic Avenue, Boston, Mass.; Arthur H. Bowditch, architect. New York Yacht Club Building, New York City; Warren & Wetmore, architects. Building for the Penn Mutual Life Insurance Company, 921 Ludlow Street, Philadelphia, Pa.; Louis Hickman, architect. Dwelling houses, 105th Street and West End Avenue, New York City; Janes & Leo, architects. Apartment house, 182d Street and Broadway, New York City; Stein, Cohen & Roth, architects. Pittsburgh & Lake Erie Railway Station, Pittsburgh, Pa.; A. W. Falk, architect; J. A. Atwood, chief engineer. Delta Phi Building, Philadelphia, Pa.; Yarnell & Goforth, architects. Fire house, Yonkers, N. Y.; E. A. Quick & Son, architects. Apartment house, 40th Street and Girard Avenue, Philadelphia, Pa.; W. H. Whitall, architect. Apartment house, 12th and Spruce Streets, Philadelphia, Pa.; Yarnell & Goforth, architects.

THE process of grinding by the use of millstones is one of the oldest mechanical arts known to man. It is, however, only within a comparatively recent period that any decided advance has been made in the use of improved millstones. This improvement consists in substituting for the softer stones in ordinary use millstones made from large blocks of Rock Emery.

Rock Emery, being as hard as a diamond, is peculiarly adapted to this purpose. An emery stone is always sharp; it never glazes, and cuts with unexampled rapidity.

Rock Emery Millstones are formed from blocks of emery rock in its natural state set in a filling of metal that is nearly as strong as iron. In use the metal filling about the blocks wears gradually away, slightly exposing the hard edges of the emery blocks, which cut like files. The bosom of this millstone and the furrows are made of a softer stone, that is easily cut away to suit any class of grinding.

To the small miller, as well as to the grinder of the hardest rocks, Rock Emery Millstones have an especial interest; as the emery face seldom requires dressing, thus dispensing with the necessity of a skilled miller.



PATENT HORIZONTAL MILL.

Emery Millstones are not expensive. They grind everything, and are by far the fastest grinders known. They are so hard and strong that they easily reduce rocks that would soon destroy all other mills. More than twelve hundred factories, some of them among the largest in the world, are using Rock Emery Millstones, reducing cements, paints, chemicals, carbon, soapstone, slate, marble, plaster, phosphates, barytes, infusorial earth, sand, and a long list of hard and soft materials.

These millstones are manufactured by the Sturtevant Mill Company, of Boston, Mass., and are made to fit any mill frame.

The cut shows a *mill* made especially for Rock Emery Stones. This mill has a 5 in. steel shaft, to which the runner is firmly fixed. The lower stone is raised and lowered by means of the hand wheel and lever, and the stones are kept in perfect tram without any attention of the miller.

The stones automatically separate to throw out bits of iron getting between them. They are fitted with special anti-friction ball-bearing steps which run in oil. The bed stone is bolted in, and cannot be got in wrong.

The stones can be entirely worn out without resetting, an advantage possessed by no other mill. It is difficult to obtain skilled millers, and this mill frame with emery stones not only grinds everything faster and finer than others, but requires less attention, and is capable of reducing substances that would soon destroy any other grinder. It is constructed to do a large amount of work, and to give the least possible trouble. Its few parts are interchangeable, and can be replaced at small expense.

We think any miller will recognize by the cut that this mill is the simplest, strongest, and by far the best he has yet seen.

The face of the Rock Emery Stone, it will be remembered, seldom requires dressing and is always sharp.

WANTED.

PRESSERS AND FINISHERS WANTED AT THE WORKS OF THE PERTH AMBOY TERRA-COTTA CO., PERTH AMBOY, N. J. APPLY TO FOREMAN, W. W. HENRY.

Cabot's Mortar Colors

BRILLIANT, DURABLE, RELIABLE

Not the lowest priced, but so strong and durable and so easy to work that they are actually the cheapest. Used fifteen years by people who insist upon *quality*.

Cabot's Brick Preservative

The only waterproofing for brickwork that is permanent. Three times as waterproof as linseed oil, and goes farther. Prevents water-soaked walls, efflorescence and disintegration by frost.

Send for circulars and prices.

SAMUEL CABOT, Sole Manufacturer,

70 Kilby Street, Boston.

Fireplace Mantels

The best kind to buy are those we make of

Ornamental Brick.

Ours are the most durable and most pleasing in every way. Our customers say so.

Send for Sketch Book of 59 charming designs of mantels costing from $12 upwards.

Phila. & Boston Face Brick Co.,

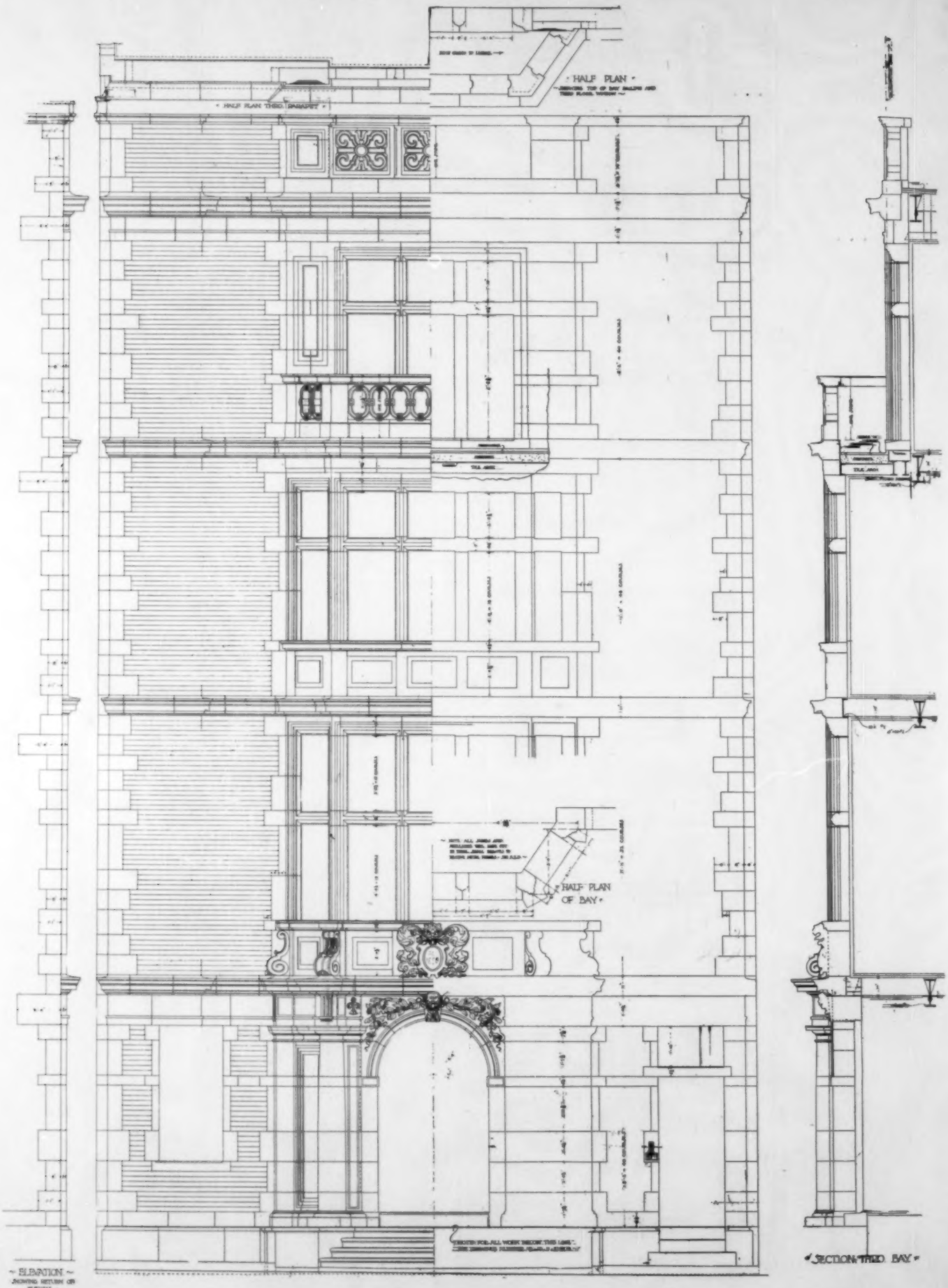
715 Liberty Square, Boston, Mass.

FRONT ELEVATION.

BERZELIUS DORMITORY, NEW HAVEN, CONN.

BRITE & BACON, ARCHITECTS.

(Illustration from photo. of building shown on page 144.)

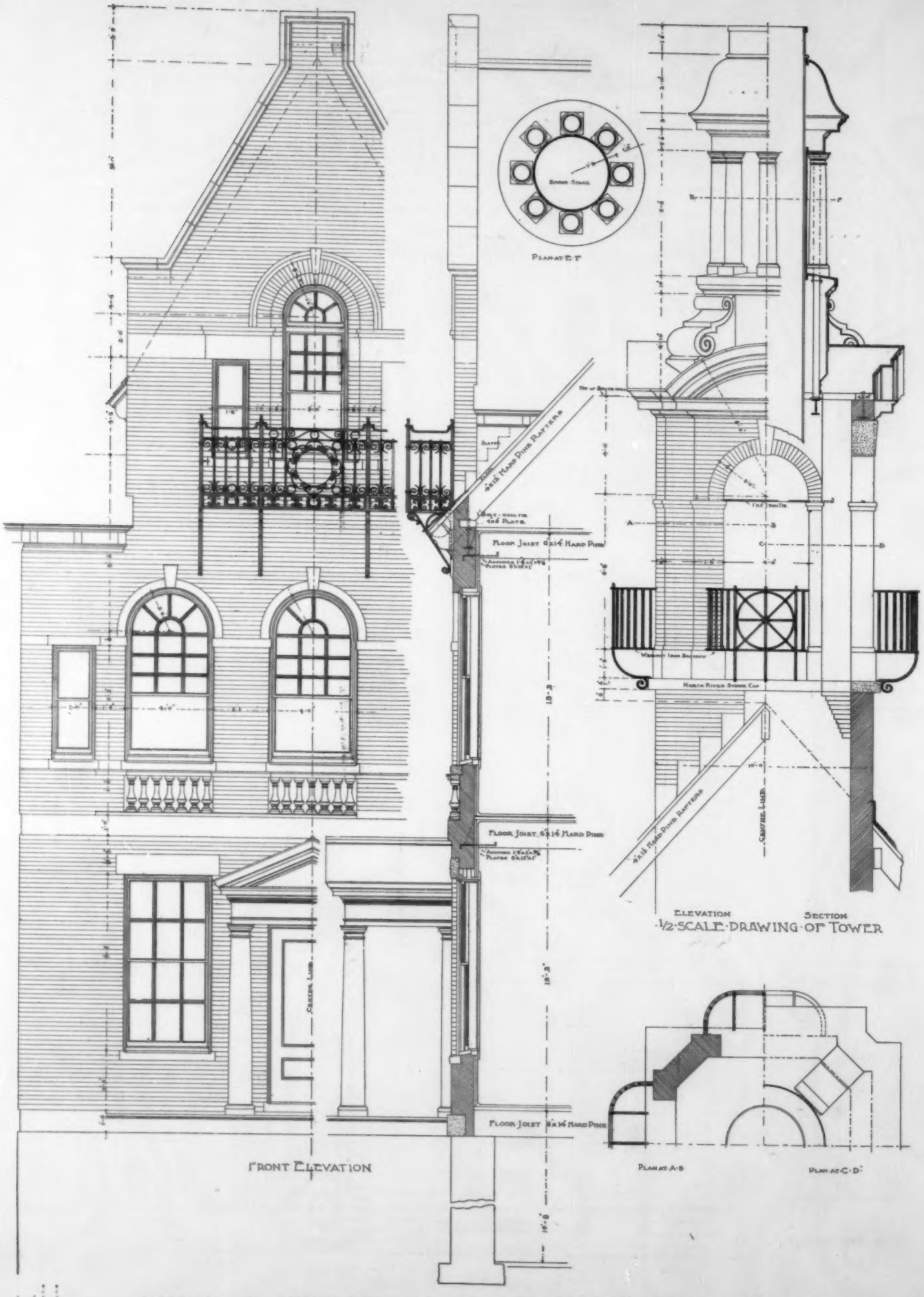


DETAIL, FRONT ELEVATION.

HOUSE No. 1 EAST 76TH STREET, NEW YORK CITY.

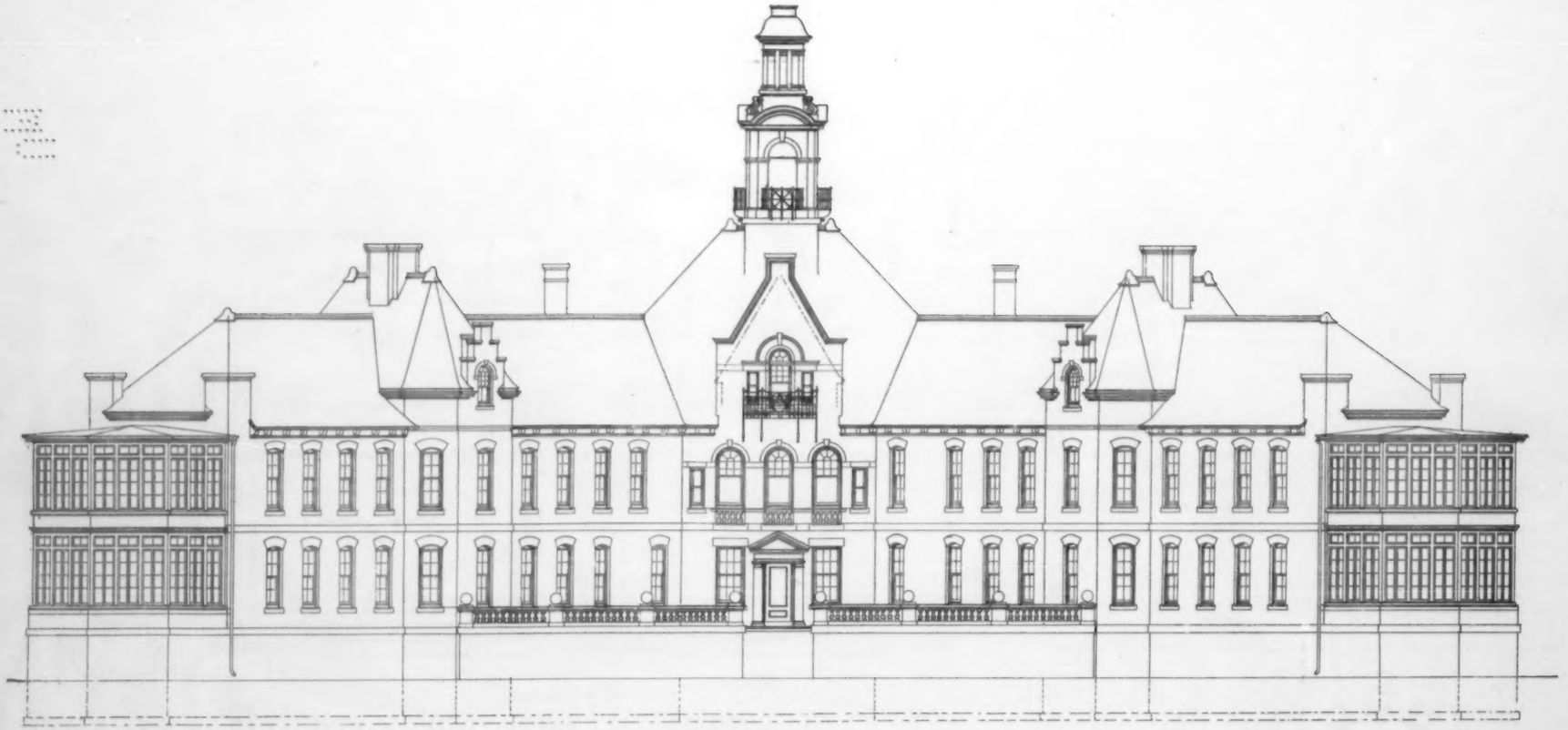
BRITE & BACON, ARCHITECTS.

(Elevation shown on page 143.)

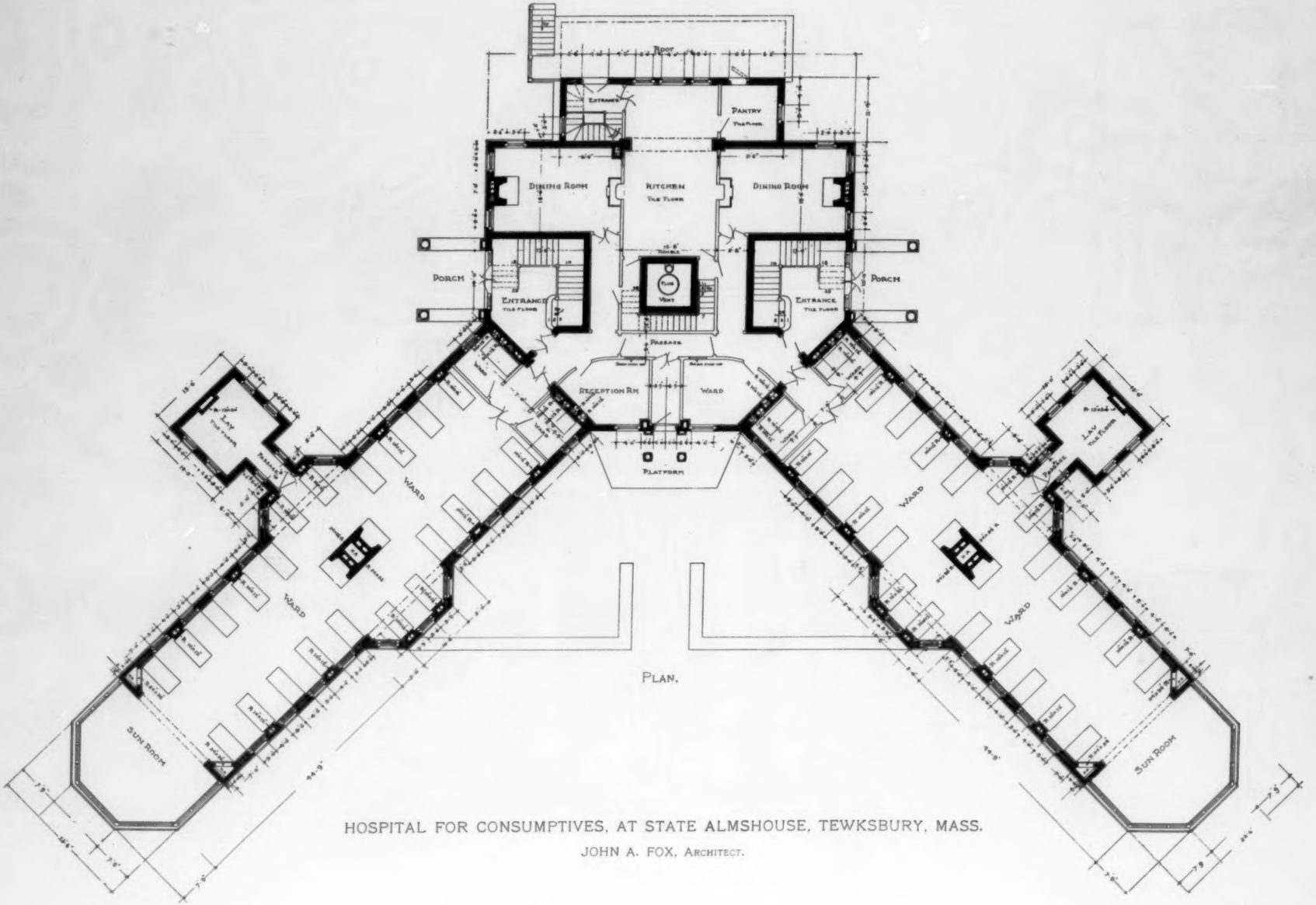


HOSPITAL FOR CONSUMPTIVES, AT STATE ALMSHOUSE, TEWKSBURY, MASS.

JOHN A. FOX, ARCHITECT.



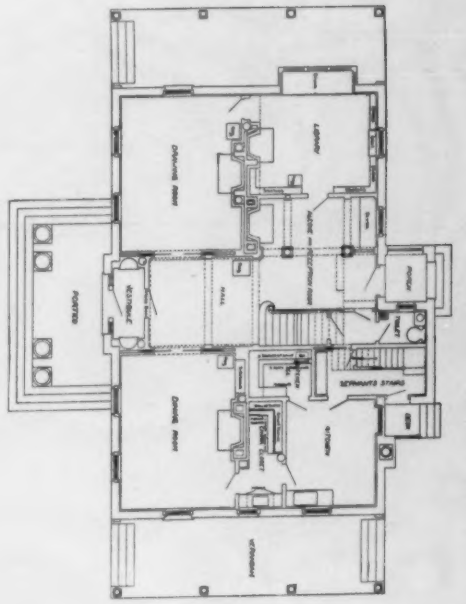
FRONT ELEVATION.



PLAN.

HOSPITAL FOR CONSUMPTIVES, AT STATE ALMSHOUSE, TEWKSBURY, MASS.

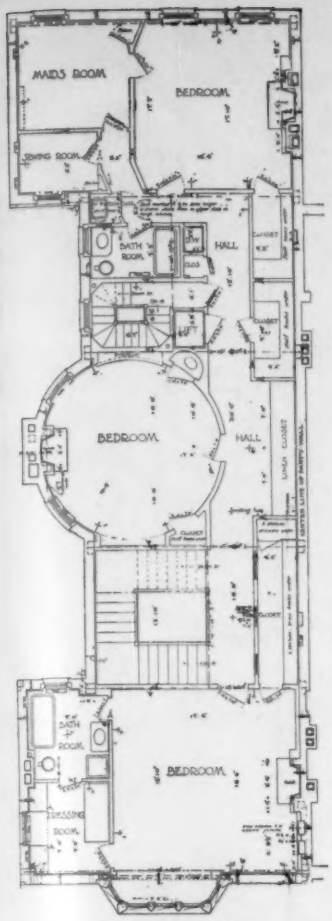
JOHN A. FOX, ARCHITECT.



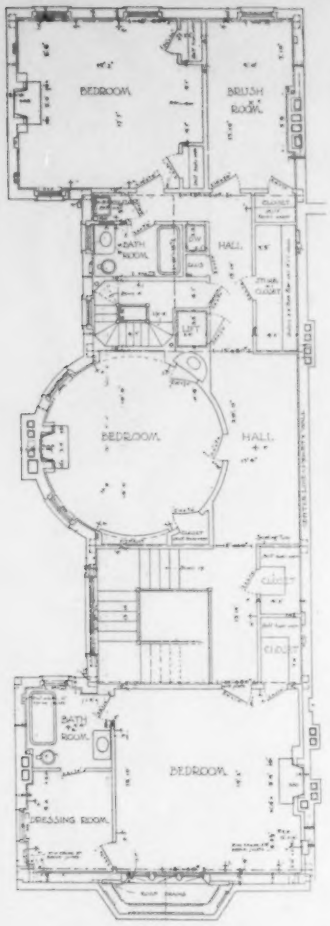
FIRST FLOOR PLAN

HOUSE AT ATHENS, OHIO.

CRAM, GOODHUE & FERGUSON, ARCHITECTS.

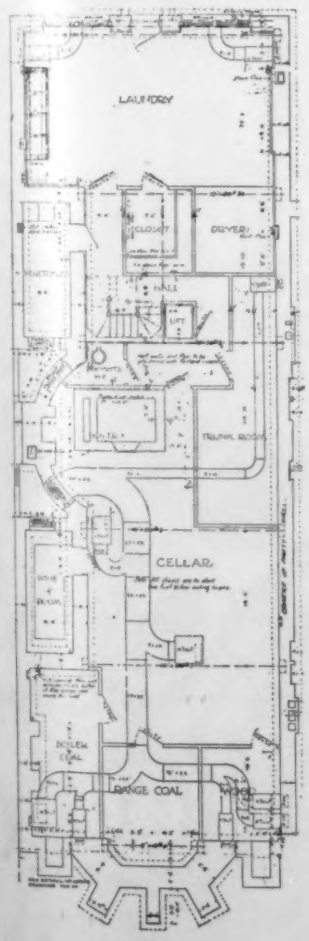


SECOND FLOOR.

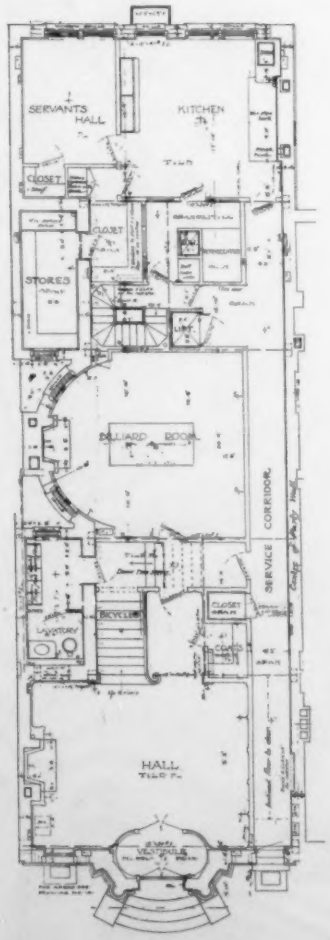


THIRD FLOOR.

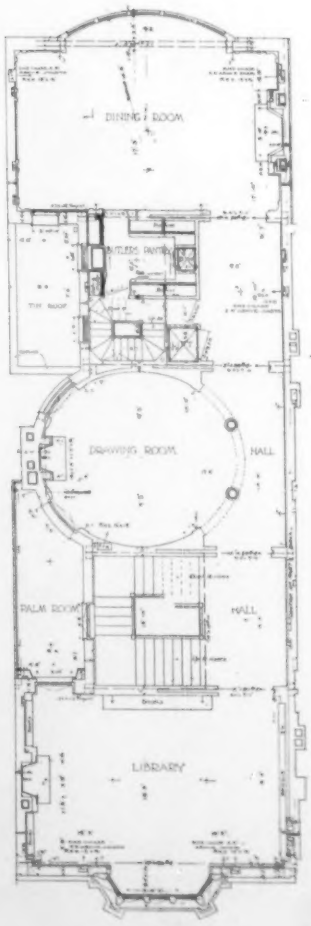
FOURTH FLOOR.



BASEMENT.



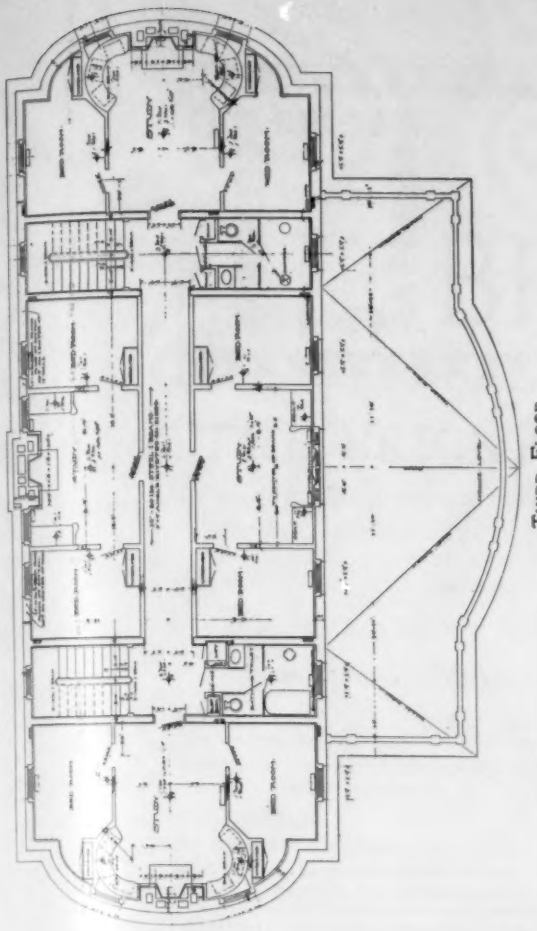
GROUND FLOOR.

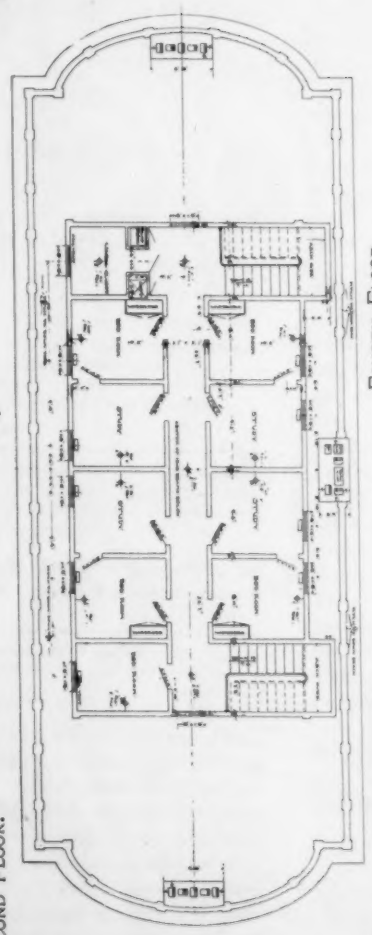


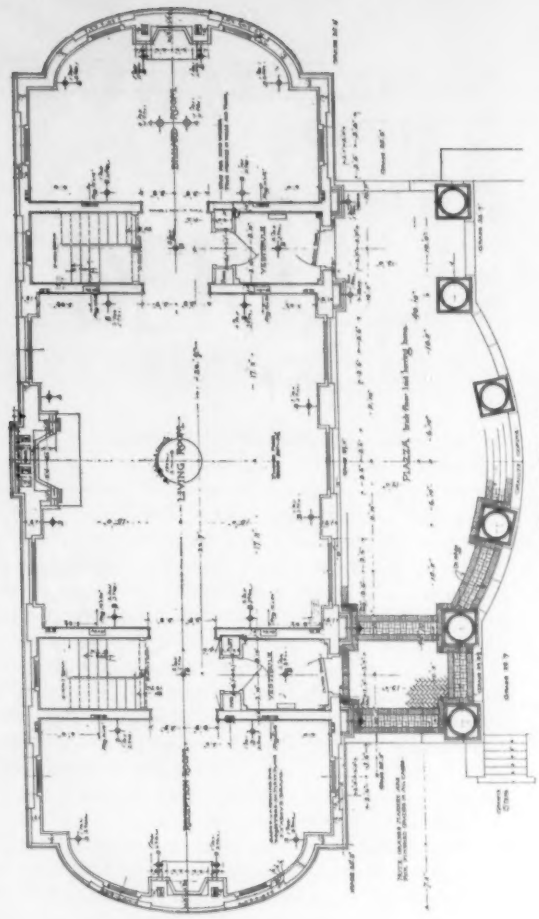
FIRST FLOOR.

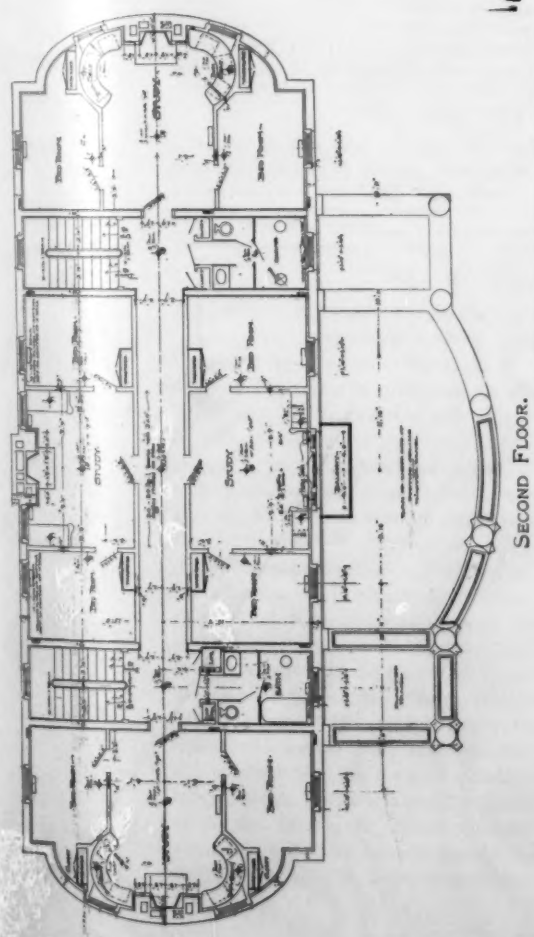
PLANS, HOUSE No. 1 EAST 76TH STREET, NEW YORK CITY.

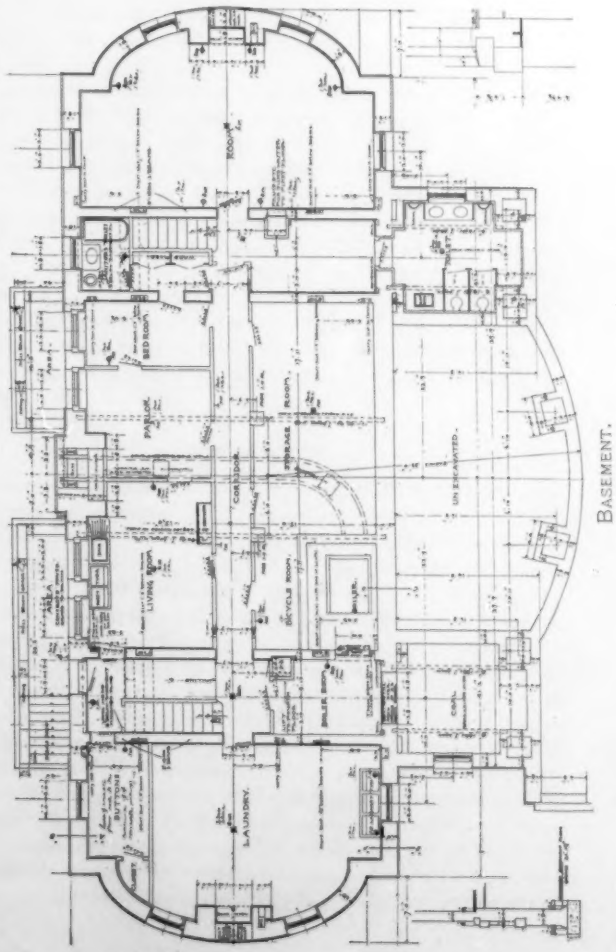
BRITE & BACON, ARCHITECTS.











PLANS, BERZELIUS DORMITORY, NEW HAVEN, CONN.

BRITE & BACON, ARCHITECTS.